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19 April 1984

USSR REPORT
LIFE SCIENCES
BIOMEDICAL AND BEHAVIORAL SCIENCES

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UDC 633.112.1:631.527:581.167

INTER- AND INTRASPECIES HYBRIDIZATION OF TETRAPLOID WHEAT TO IMPROVE
PARENTAL MATERIAL IN BREEDING INTENSIVE-TYPE HARD WINTER WHEAT

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
(manuscript received 6 Apr 81) pp 25-28

TAVRIN, E. V. and AL'DEROV, A. A., All-Union Scientific Research Institute
of Plant Breeding imeni N. I. Vavilov

[Abstract] Hybridization studies were conducted to combine the short-stem trait with other valuable traits in tetraploid wheats, and to determine the usefulness of the 28-chromosome wheats in breeding intensive-type hard winter wheat. Crossing studies with *T. Turgidum*, *T. turanicum*, *T. Dicoccum* and *T. persicum* demonstrated that such a combination of traits could be obtained in a given plant, based on analysis of plant height, grain weight, grain count per ear, etc. Such plants represent an improvement over the parental variants and are potentially useful in developing intensive-type hard winter wheat varieties. References 12 (Russian).
[240-12172]

UDC 633.11:631.523.5+631.572.12

SELECTION EFFECTS IN IMPROVING RESTORER FUNCTION IN WHEAT

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
(manuscript received 25 May 81) pp 29-31

PALILOVA, A. N. and RAL'KO, V. P., Institute of Genetics and Cytology,
Belorussian SSR Academy of Sciences, Minsk

[Abstract] Testing was conducted on the restorer function of three populations of restorer varieties containing *Triticum timopheevii* cytoplasm. The grain content per ear of F_1 hybrids obtained by using a restorer population increased from 34.37% to 74.07%; however, the grain content per ear in F_1 hybrids resulting from using restorer lines that had been subjected to a four-fold selection for maximum grain content ranged from 72.64 to 85.87%.

Consequently, selection of restorers containing T. timopheevii cytoplasm for maximum grain content per ear actually improves their restorer function which, in turn, improves the F₁ hybrid harvest. References 5: 2 Russian, 3 Western.
[240-12172]

UDC 632.42:632.03

COMPARATIVE EVALUATION OF METHODS FOR ASSESSING DAMAGE DUE TO ROOT ROT OF SPRING WHEAT

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
(manuscript received 23 Apr 82) pp 72-77

MIKHAYLINA, N. I., Scientific Research Institute of Agriculture of the Southeast, Saratov

[Abstract] A comparative evaluation was made of various methods employed to assess crop damage caused by root rot of spring wheat. The evaluation encompassed an analysis of the methods used to collect sheaf samples and to determine the fungal load under the conditions prevailing in the Volga region. Evaluation of the results obtained for Saratov 40 (hard) and Saratov 36 (soft) varieties showed that there were no statistically significant differences in the results obtained by the different methods. It appears that selection of many small samples for analysis, and repetition of such selection, constitutes the most rational approach to the problem of predicting and assessing crop damage. Following mathematical analysis of the various factors involved in crop loss due to root rot, regression equations were derived for evaluating spring wheat loss in the Volga region. References 16 (Russian).
[2340-12172]

UDC 547.596.1:630.453

SYNTHESIS OF IPSDIENOL, COMPONENT OF AGGREGATION PHEROMONE OF IPS GENUS BARK BEETLE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 12, Dec 83
(manuscript received 24 May 83) pp 1658-1662

KOZHICH, O. A., PYZH'YANOVA, N. Ye., SEGAL', G. M. and TORGOV, I. V., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] A novel synthesis of ipsdienol--2-methyl-6-methylene-2,7-octadien-4-ol--was developed using myrcen, which upon reaction with HOBr gave 3-bromo-2-methyl-6-methylene-7-octen-2-ol (I). Dehydrobromination of

I with sodium methoxide in methanol yielded myrcene oxide. The latter reacted with methylmagnesium iodide (and then with an equimolar quantity of acetyl chloride), to yield two compounds which upon chromatography gave ipsdienol as the principal product. References 12 (Western).
[243-7813]

UDC 547.596.1:630.453

SYNTHESIS OF 2,2,4,6,6-PENTAMETHYL-3,6-DIHYDRO-2H-PYRANE AND 2,2,6,6-TETRAMETHYL-4-METHYLENETETRAHYDROPYRANE, ACTIVE ANALOGS OF BARK BEETLE PHEROMONES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 12, Dec 83
(manuscript received 27 May 83) pp 1663-1666

KOZHICH, I. A., SEGAL', G. M. and TORGOV, I. V., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] The two objects of this study were analogs of natural pheromones of bark beetle: 2,2,4,6,6-pentamethyl-3,6-dihydro-2H-pyrane (I) and its isomeric 2,2,6,6-tetramethyl-4-methylenetetrahydropyrane (II), both of which were previously synthesized in small quantities by a complex reaction sequence. Now it is shown that they can be obtained from easily-available esters of 3-ketoglutaric acid. The synthesis, which is detailed, proceeds through a sequence of steps, including a Wittig reaction followed by reaction with methylmagnesium iodide and, finally, cyclodehydration to I and II.
References 11: 3 Russian (2 by Western authors), 8 Western.
[243-7813]

SCIENCE AND MAXIMUM HARVESTS

Moscow PRAVDA in Russian 26 Dec 83 p 7

KURSANOV, A., academician, and MOKRONOSOV, A., corresponding member,
USSR Academy of Sciences

[Abstract] Modern advances in biology have found their way into crop improvement, yielding greater harvests and better quality crops. Other technical and scientific advances have led to more rational utilization of available resources in crop protection, storage and treatment, and in more efficient use of land and fertilizers. However, the full exploitation of plant potentials and of the various means available for crop improvement requires complete understanding of plant physiology and biochemistry. In this regard, it is a matter of some concern that certain Soviet universities have eliminated departments and chairs of plant physiology, as has been the case at the universities of Lvov, Tomsk, Rostov, and Far-Eastern University, to mention only a few. Perhaps the time is ripe for the

establishment of an All-Union society of plant physiologists and bio-chemists to promote research and interest in the fundamental aspects of plant function.

[259-12172]

UDC: 633.11"321":581.111

PRODUCTIVE POTENTIAL OF LENINGRADKA SPRING WHEAT AS A FUNCTION OF MOISTURE SUPPLY TO PLANTS

Moscow DOKLADY VASKHNIL in Russian No 11, Nov 83
(manuscript received 16 Dec 82) pp 10-12

KALININ, N. I., All-Union Order of Lenin and Order of People's Friendship
Scientific Research Institute of Plant Husbandry imeni N. I. Vavilov

[Abstract] Experiments were performed in large vegetation vessels containing 40 kg of air dry mass, in which the Leningradka spring wheat was planted. Maximum and minimum moisture content indices were determined and the soil moisture was regulated between 40 and 140% HB in 10% steps. The desired moisture content of the soil was maintained constant throughout the vegetation season by weighing and adjusting the mass of the vessel to the calculated level. The range of soil moisture contents was sufficient to produce an entire spectrum of results, from underwatered to overwatered. The greatest number of grains per head was obtained at 100% HB. These same plants also had the greatest number of heads, of blossoms and the highest fertilization percentage. The highest mass of 1000 grains was obtained at a moisture content of 60% HB, although the number of grains per head and number of heads per plant were both less than at 100% HB. The highest total production was obtained at 110% HB, 14% higher than at 100% HB. The method developed allows accurate determination of the productive potential of strains of wheat. References 4 (Russian).

[247-6508]

UDC: 633.1:632.7

PRIMARY ENTOMOPHAGES OF GRAIN PESTS AND FACTORS FACILITATING INCREASING EFFECTIVENESS IN UKRAINIAN STEPPE

Moscow DOKLADY VASKHNIL in Russian No 11, Nov 83
(manuscript received 18 Feb 83) pp 19-21

SUSIDKO, P. I., academician, All-Union Academy of Agricultural Sciences,
PISARNEKO, V. N. and BONDARENKO, N. I., All-Union Order of Labor Red
Banner Scientific Research Institute of Corn

[Abstract] Grain entomophages in the Ukrainian Stepps are trophically related with plant pests. The authors determined the composition of the most

numerous species of useful insects from the order Coleoptera. Dominant species included *Bembidion properans* Steph., *B. lampros* Hbst., *Microlestes minutulus* Goeze., *Broscus cephalotes* L., *Pterostichus sericeus* F. W., *Pt. crenuliger* Chd., *Pt. melanarius* Hl., *Pt. cupreus* L., *Calosoma auropunctatum* Hbst. The abundance of these predators results from the fact that they are adapted to tolerate unfavorable conditions during winter in the soil, including plowing, whereas most other parasites and predators are not. Also, the insects pass through their most vulnerable stages of life at times when the soil is not intensively worked. By adapting the time and type of working of the soil and schedule of application of pesticides, populations of useful insects of these species can be encouraged to grow, controlling plant pests. Figure 1; references 10 (Russian).
[247-6508]

UDC: 633.11"321"631.524.01:632.38

BIOLOGIC ACTIVITY OF BARLEY STREAK MOSAIC VIRUS ON WHEAT

Moscow DOKLADY VASKHNIL in Russian No 11, Nov 83
(manuscript received 14 Mar 83) pp 21-23

BURDUN, A. M., PANARIN, I. V., ZABAVINA, Ye. S., Krasnodar Order of Leningand Order of Labor Red Banner Scientific Research Institute of Agriculture imeni P. P. Luk'yanenko

[Abstract] Experiments were performed at the authors' institute in 1970-1982 in greenhouse and in the field. Several varieties of spring wheat were infested by mechanical inoculation with the sap from infected winter barley plants at the 2-3 leaf stage. The seeds of the infected plants were transplanted into the fields in spring. Reproductive material was planted once again in the greenhouse and plants were selected with clear signs of deviation from typical development in the heading phase. The most typical types of deviations are noted. Several varieties of wheat had up to 83.9-98.5% of plants affected by the virus, others had lower percentages of plants affected but a greater variety of effects. The virus is thus capable of causing aberrations and genome mutations (aneuploidy) with a frequency of 0.03-0.008. References 5: 3 Russian, 2 Western.
[247-6508]

PRESERVATION OF NATURAL ENTOMOPHAGE POPULATIONS

Moscow DOKLADY VASKHNIL in Russian No 11, Nov 83 p 45

SABDULLAYEV, A. U.

[Abstract] A study was made to determine the factors influencing decreases in the population of entomophages which tend to protect the cotton crops of Uzbekistan from harmful insects occurring during cultivation of the crops. Beginning in 1977, the authors studied the influence of individual agricultural measures on the population of entomophages of lucerne and cotton pests in plantings of lucerne. It was found that mowing decreased the entomophage population by a factor of 22 to 40. The conveyor method of harvesting was particularly detrimental to the entomophage population, especially when performed in the morning or evening. Figures 2; references 3 (Russian).

UDC 577.156

COVALENT IMMOBILIZATION OF PANCREATIC TRYPSIN INHIBITOR ON POLYMER CARRIER

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 5, Sep-Oct 83 (manuscript received 19 Oct 82) pp 645-658

MAKLAKOVA, I. A., VALUYEVA, T. A., KOLOSOVA, G. V., VALUYEV, L. I., MOSOLOV, V. V. and PLATE, N. A., Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow; Moscow State University

[Abstract] Acylation of protein with anhydrides or chloranhydrides of unsaturated acids introduces a double bond into the protein molecule without changing its conformation or biological activity, and involves only the end amino-group and the epsilon-amino-group of the lysine. The authors applied this method to immobilize pancreatic trypsin inhibitor from cattle lungs, after purifying the latter by affine chromatography. Trypsin was immobilized by attachment to activated sepharose 4V, then copolymerized with acrylamide and N,N'-methylenebisacrylamide. Acylation involved the chloranhydride of acrylic acid. A slight imbalance between the chloranhydride and the acylated amino-group quantity is attributed to partial hydrolysis of the former before acylation could occur. Results indicated that the immobilization method described was applicable to produce the desired trypsin inhibitor and subsequent copolymerization as long as suitable active center protection is provided. It can also be used where lysine remains in the active center. Figures 2; references 14: 7 Russian, 7 Western.
[250-12131]

UDC 541.183.4;577.156.3

KINETICS OF TRYPSIN IMMOBILIZATION ON ACTIVATED SILOCHROME

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 55, No 5, Sep-Oct 83 (manuscript received 10 Oct 82) pp 499-502

LYUBINSKIY, G. V., YANISHPOL'SKIY, V. V. and TERTYKH, V. A., Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, UkSSR Academy of Sciences, Kiev

[Abstract] The process of trypsin immobilization on activated silochrome is described with the use of equations of kinetics of absorption which make

it possible to predict the kinetics of bonding of trypsin on carriers of various particle sizes. The process was found to be controlled by the rate of diffusion of the enzyme. This study employs previously developed mathematical procedures to plot a kinetic curve of the enzyme immobilization on the matrix with particles of any size by an experimentally obtained kinetic curve of its binding on the carrier with a specific particle diameter. The validity of this simple method was shown by calculation, from an experimental curve of trypsin immobilization on silochrome with a mean radius of $19.4 \cdot 10^{-2}$ cm, of analogous curves for particles with a mean radius of $14.2 \cdot 10^{-2}$ cm and $28.4 \cdot 10^{-2}$ cm. Figures 3; references 13: 9 Russian, 4 Western.
[273-2791]

BIOTECHNOLOGY

BRIEFS

PROTEIN FROM GAS--The Svetliy Yar plant for production of protein-vitamin concentrates has produced the first kilograms of a product which has no analogs either in our country, or abroad. The plant will be the first to begin producing gaprin--feed-protein--from natural gas. I am approaching the plant. The structure, which has been stated in the center of operating production, has spoiled the external appearance of the enterprise somewhat: mountains of still unharvested soil, motor vehicles continually scurrying about. But what is one to do: here the future is being born, not only of this plant, but of the entire sector. At first glance, the plant is nothing out of the ordinary: a technological tower, like one you encounter at every chemical enterprise, with an endless crest of pipes rushing toward it. To make up for it, the process performed here is incredible: going in--natural gas, and coming out--a protein concentrate, a valuable product for fattening livestock. Moreover, each ton of this concentrate saves approximately 7 tons of grain. "It started," related R. Ketrush, director of the Scientific Research Institute for Protein Synthesis, "when we discovered stamens of bacteria which are capable of synthesizing protein in a medium of natural gas, usually methane, in the earth on the grounds of a certain oil reprocessing plant. Does this mean that the device at the Svetliy Yar PVC [protein-vitamin concentrates] plant has been designed "from test-tubes"? Not by any means. This new method had been developed for almost 10 years at a small experimental plant in the city of Nartkal in the Kabardino-Balkarian ASSR. Several different variants of the techniques have been tested. Several dozen tons of the product have been turned out; it has gone through thorough medical-biological tests and now is authorized for use by the USSR Ministry of Agriculture and the USSR Ministry of Health." Gaprin, produced from methane, contains up to 75 percent raw protein, along with other valuable substances and many vitamins. Industrial production of a biomass from gas will be markedly cheaper. "The new plant," added A. Grigoryan, head of the laboratory of the Scientific Research Institute for Protein Synthesis, "is designed in such a way, that in principle it is possible to obtain production in it not only from natural gas, but, also, methyl alcohol." And what prospects does the new biotechnology open? Here is how M. Sobolev, assistant director of the Main Administration of the Microbiological Industry of the USSR, answered this question: "Our most immediate goal is to bring out the first fermenter on a minimum schedule with productivity of at least 2 tons a day. The next step is to intensify the process. Then we will construct

a fermenter with a very large work capacity. We will begin to create a module which will serve as a prototype for future gigantic plants. We do not doubt that these plans will be put into practice." [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Dec 83 p 1 Category 6] 12473

UDC 579.852.11.222

PRODUCTS OF CASEIN AND ELASTIN HYDROLYSIS BY BACILLUS SUBTILIS PROTEASE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 5, Sep-Oct 83
(manuscript received 19 May 82) pp 13-16

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[Abstract] Comparative studies were conducted on the products obtained by hydrolysis of casein and elastin by *Bacillus subtilis* protease and pancreatin. The bacterial enzyme hydrolyzed 69-74% of the peptide bonds in casein; oligopeptides accounted for 56-86% of the hydrolysis products and free amino acids for the rest (largely leucine, isoleucine, aspartic acid, methionine and lysine). Hydrolysis of elastin yielded largely peptides (75-92% of the total products) and leucine, glycine and valine with hydrolytic cleavage of 44-55% of the peptide bonds by the bacterial enzyme. The action of pancreatin on elastin was more complete, with hydrolytic cleavage of ca. 80% of the bonds and a product distribution of ca. 76% oligopeptides and 24% free amino acids. Figures 4; references 3: 2 Ukrainian, 1 Russian.
[252-12172]

UDC 579.852.11.083.13

BIODEGRADATION OF HEXAMETHYLENEDIAMINE BY BACILLUS SUBTILIS 21/3:
EFFECTS OF CULTURE STORAGE CONDITIONS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 5, Sep-Oct 83
(manuscript received 1 Jun 82) pp 17-20

GARBARA, S. V. and ROY, A. A., Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Since hexamethylenediamine (HMD)-degrading *B. subtilis* 21/3 is an industrially valuable culture, studies were conducted on the effects of storage conditions on the preservation of metabolic activity of this culture.

Full viability and biodegradability of HMD was retained for four years by cultures maintained on meat-peptone agar and synthetic solid medium, both supplemented with 5 g/liter of HMD adipinate, at 20-22°C and at 4°C with bimonthly transfers. Similar results were obtained with a centrifuged *B. subtilis* 21/3 biomass stored at 4°C with bentonite (100 mg/liter) and $\text{Al}(\text{NO}_3)_3$ (200 mg/liter). Finally, lyophilized cultures stored at 4°C for six months also retained viability and HMD-degrading activity, but the rate of HMD metabolism was significantly slower. It is evident, then, that a variety of methods are available for the preservation and storage of a bacillus strain that has considerable importance in the treatment of HMD-polluted waste waters. Figures 2; references 11: 10 Russian, 1 Western. [252-12172]

GROWTH OF MYCELIUM OF POLYPORUS SQUAMOSUS HUDS. EX. FR. IN SUBMERGED CULTIVATION

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 5, Sep-Oct 83 (manuscript received 8 Jun 82) pp 617-623

MOROZOVA, G. R., BOGDANOV, K. M., CHERNUKHA, B. A., SHIKHER, V. I. and MAKAROVA, M. A., All-Union Scientific Research Institute for Protein Substance Biosynthesis, Moscow

[Abstract] Raising mycelia of higher fungi in liquid media by microbiological synthesis is a new area of technical mycology leading to production of industrial quantities of higher fungi or raw material for producing biologically-active substances. To further research in this area, the authors studied economic and physiological parameters, productivity, average rate of growth and other features under varying growing conditions to develop theoretical calculations for continuous cultivation. *Polyporus squamosus* (Huds ex. Fr.) was cultivated on the US "Fermatron" and the French "BiolaFit" cultures, and data were gathered and processed by a prediction method based on a graph reflecting concentration of biomass and productivity. The data showed the physiological state of the mycelium at given time periods of cultivation and reflected maximum productivity. Calculations and experimental values indicated no more than a 10% error in predicting growth and productivity. The procedure described can thus be applied to cultivating higher fungus mycelia for commercial uses. Figures 4; references 11: 10 Russian, 1 Western. [250-12131]

OPTICAL METHOD FOR DETERMINING BIOMASS IN SUBMERGED CULTIVATION OF
DIOSCOREA DELTOIDEA WALL

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 5,
Sep-Oct 83 (manuscript received 3 May 82) pp 624-631

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[Abstract] Although cells of higher plants are commonly cultured using methods of microbiology, the morphophysiological features of plants and of microbes differ greatly. Measurements of cell content and dry and wet biomass are time-consuming and inaccurate despite elaborate special equipment. The authors sought to determine biomass optically for *D. deltoidea* Wall by studying changes in optical density in relation to various growth criteria during a periodic cultivation cycle. Results showed that maximum optical density and maximum wet biomass accumulation coincided. Independent experiments using CO₂ and bubbling air as conditioners confirmed the accuracy of the method. Further investigation weighed factors such as uneven growth of cells under the same conditions from one experiment to another, and the possibility of increasing optical density due to cell death rather than expanding biomass (as occurred when no CO₂ was added to the culture). With these qualifications, the optical density method was judged effective as a supplemental method in both periodic and constant cultivation, and with densities of $5 \cdot 10^3$ to $1 \cdot 10^6$ cells/ml, it can be the basic method of analysis. Figures 7; references 10: 4 Russian, 6 Western.
[250-12131]

UDC 595.3(269)

BIOMASS AND PRODUCTION OF ANTARCTIC KRILL (*EUPHASIA SUPERBA* DANA)

Moscow OKEANOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 17 Jun 83) pp 1015-1017

VORONINA, N. M., Institute of Oceanology imeni P. P. Shirshov, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the productivity of the Antarctic krill based on productivity data on other organisms at the same trophic level, i.e., the copepods. Using the mathematical models available for copepod populations in relation to available food uplied and the P/B coefficients for krill and the copepods, biomass and productivity figures were calculated. In the Antarctic areas of krill predominance the biomass values appear to fluctuate within the limits of 13 to 25 g/m², and the mean annual productivity within the range of 24 to 47 g/m². Calculations for the entire Antarctic are indicate that copepod productivity exceeds that of krill by an order of magnitude. References 17: 10 Russian, 7 Western.
[277-12172]

UDC 557.472.623

NUTRITIONAL ASPECTS OF ANTARCTIC KRILL

Moscow OKEANOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 5 Jan 82) pp 1018-1022

SAMYSHEV, E. Z. and LUSHOV, A. I., Azov-Black Sea Research Institute of Marine Fishery and Oceanography, Kerch

[Abstract] Studies were conducted on the nutritional status and balance of Antarctic krill after 6-12 h of adaptation to laboratory conditions and provision of algae and their detritus as nutrients. Maximum feeding was observed at noon and midnight, which correlated with diurnal metabolic rhythm. Threshold feed concentration was calculated at 0.005 mg/liter for consumption to commence, while maximum feeding, weight gain, and nutrient assimilation occurred at a nutrient concentration of 6 to 8 mg/liter. The

coefficient of assimilation of nutrient for growth showed a decrease from a value of 0.64 to 0.21 as the body length of the krill increased from 16.0 mm to 50.0 mm. Figures 4; references 7: 6 Russian, 1 Western. [277-12172]

UDC 557.472(26):7.021.2

SIMULATION OF FOULING COMMUNITIES: SENSITIVITY TO ENVIRONMENTAL FACTORS AND PROGNOSTIC DYNAMICS

Moscow OKEANOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 13 Oct 82) pp 1030-1038

GAL'PERIN, M. V., Institute of Oceanology imeni P. P. Shirshov, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the dynamics of fouling populations in the Taganrog region of the Sea of Azov in relation to salinity and available food supplies, mostly zoo- and phytoplankton, using simulation models in the analysis. Variation of the salinity and food supply factors demonstrated that fouling population growth is greater at a salinity of 8% than at 5% salinity. In the presence of 5% salinity virtually all the factors indicative of viability are compromised and assimilation of foodstuffs is markedly reduced. In general, in combination with appropriate levels of salinity medium, counts for zoo- and phytoplankton also favor multiplication of the fouling organisms, and can be used as indicators for predicting the population levels of the various fouling organisms. Figures 3; references 14 (Russian). [277-12172]

UDC 593.11;551.2.23

ABYSSAL BENTHIC FAUNA AS INDICATOR OF MICROHYDROTHERMAL SPRINGS AT OCEAN BOTTOM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 83
(manuscript received 4 Oct 83) pp 247-250

TURPAYEVA, Ye. P., Institute of Oceanology imeni P. P. Shirshov, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the abyssal benthic fauna in the Northeastern part of the Pacific ocean to determine the indicator value of such fauna for the detection of hydrothermal springs. The studies were conducted in 1982 at two sites between the Clarion and Clipperton breaks in the Northeastern basin, one located at 9°31.4'N, 152°40.3'W (4660-5340 m depth) and the other at 10°02.4'N, 146°29.4'W (4900-5300 m depth). A variety of known and previously undescribed protozoans were collected, many ascribed

to the families Xenophyophoria and Komokiacea and the class Sarcodina. In terms of quantity the various subsites could be classified on whether the biomass amounted to more or less than 0.2 g/m^2 , with all of the samples with a biomass greater than 0.2 g/m^2 located in the vicinity of hydrothermal springs. It appears, therefore, that the quantity of benthic biomass can serve as an indicator of the presence of hydrothermal springs. Figures 2; references 13: 6 Russian, 7 Western.
[278-12172]

UDC: 582.28:547.96

MUSHROOMS AS NUTRIENT PROTEIN SOURCE

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 17, No 3, May-Jun 83
pp 177-181

GORLENKO, M. V.

[Abstract] Commercial production of edible mushrooms is discussed. The protein yield per unit of arable land is significantly greater in mushroom raising than in production of meat or fish, as great as 567 tons of dry protein per hectare per year according to British sources. Methods of raising of mushrooms and other edible fungi are discussed. It is concluded that commercial production could significantly decrease the world protein deficit. The next step is the organization of commercial large scale production of edible mushrooms to improve the nutrition of the population. The Institute of Botany, Ukrainian Academy of Sciences, is suggested as a coordinating center for the work.
[253-6508]

UDC 547.963.32.05:577.113.6

5-SUBSTITUTED 2'-DESOXYURIDINES IN SYNTHESIS OF INTERNUCLEOTIDE BOND
CATALYZED BY RIBONUCLEASES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 12, Dec 83
(manuscript received 10 May 83) pp 1625-1633

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[Abstract] Analogs of desoxynucleosides are potential candidates for anti-viral and antitumor agents. In the present work, inclusion of 5-substituted 2'-desoxyuridines in oligonucleotides was studied in presence of ribonucleases. These desoxyuridines were used as phosphate acceptors in reactions with nucleoside-2',3'-cyclophosphates in presence of nonspecific ribonuclease Pen. brevicompactum and pyrimidine-specific pancreatic ribonuclease. In the first case the phosphate donor was adenosine-2',3'-cyclophosphate and in the second - cytidine-2',3'-cyclophosphate. Dinucleosidemonophates were obtained for all β -desoxynucleosides studied; it was not possible to perform the reactions with α -nucleosides. For the first time, the following 2'-desoxyuridines (D) were synthesized: adenylyl(3'-5')-5-fluoro-D, adenylyl(3'-5')-5-(α -hydroxy-hexafluoroisopropyl)-D, adenylyl(3'-5')-5-trimethylsilyl-D, cytidilyl(3'-5')-5-(α -hydroxyhexafluoroisopropyl)-D, and cytidilyl(3'-5')-5-trimethylsilyl-D. Analysis of electron density of these compounds explained the reason for the difference in the acceptor activity towards phosphate observed between the 5-substituted and the unmodified desoxyuridines. Figures 3; references 18: 14 Russian (1 by Western authors), 4 Western (2 by Russian authors).
[243-7813]

SOLID PHASE DETERMINATION OF DNA NUCLEOTIDE SEQUENCE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 12, Dec 83
(manuscript received 13 Jul 83) pp 1634-1637

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[Abstract] Currently, the most widely used method for determining DNA nucleotide sequence is the Maxon-Gilbert method, applicable to analysis of primary structures of natural DNAs and synthetic oligo- and polynucleotides. However, it is a complicated method with many steps, involving lyophilization, precipitation and washing procedures. In the present paper, a modified solid phase method is described for determining DNA sequences based on the adsorption of terminally-labelled DNA on DEAE paper and performance of all other operations in solid phase and not in solution as is done in the Maxon-Gilbert method. This leads to simplified and shortened operations without loss of overall efficiency. Figure 1; references 5: 2 Russian, 3 Western (1 by Russian authors).
[243-7813]

UDC 579.842.23:577.152.211

DNA-METHYLTRANSFERASES OF PLAGUE MICROBE

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 55, No 5,
Sep-Oct 83 (manuscript received 29 Nov 82) pp 489-493

DEMIDOVA, G. V., SKOPICH, A. A., ZYUZINA, V. P. and TYNANOVA, V. I.,
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[Abstract] Chromatographic isolation of DNA-transferases of the plague microbe was performed and their specific properties were described and discussed. It was found that strain Y, pestis EV cells contain at least two (adenine and cytosine) DNA methyltransferases. Such enzymes in different species of bacteria either are an independent system of cell methylation or are a component of a modification-restriction complex. In some cases, segments of recognition of DNA adeninemethyltransferase and DNA cytosine-methyltransferase and modification-restriction overlap completely or partially. Determination of the DNA nucleotide sequences recognized by them is necessary in determining the specificity of plague microbe methyltransferases. Figures 2; references 15: 10 Russian, 5 Western.
[273-2791]

MUTAGENIC ACTION OF O-METHYLHYDROXYLAMINE ON TRANSFORMING DNA

Moscow GENETIKA in Russian Vol 19, No 9, Sep 83
(manuscript received 2 Aug 82, final version 23 Dec 82) pp 1397-1403

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[Abstract] In vitro mutagenesis on transforming DNA has been used effectively because it eliminates the effect of the mutagen on the bacterial cell. The present article reports on mutagenic action of O-methylhydroxylamine (OMHA), which unlike other agents does not damage DNA. Two products of cytosine modification, N⁴-methoxycytosine and N⁴-methoxy-6-methoxyamino-5,6-dihydrocytosine, affected the genetic consequences of the OMHA. Furthering this research, the authors studied mutagenic action, at 4.5 and 6.0 pH, on Bac. subtilis transforming DNA as well as premutational damage of recipient cell mutation relating to repair, recombination and vegetative autoreplication. Nucleophile agents such as OMHA attack nucleic bases in a plane perpendicular to the heterocycle, and so modification was only attempted of bases that were not screened by neighboring planes. Results indicated that pure replicative mutagenesis was involved. Of the 2 basic products of DNA-OMHA reaction, one served as a source for mutagenesis without attacking the DNA, while another compound caused inactivating damage. Antimutagenic repair of DNA as a function of the excision UVR-system of Bac. subtilis was an important factor. Thus the effectiveness of mutagenesis was directly related to the rate of repair and replication. An opposite effect was observed when autoreplication of DNA was retarded for a time. Figures 4, references 18: 6 Russian, 12 Western.

[251-12131]

HOMOLOGY OF BROAD HOST RANGE PLASMIDS

Moscow GENETIKA in Russian Vol 19, No 9, Sep 83
(manuscript received 10 Nov 82) pp 1409-1418

SAKANYAN, V. A., KRUPENKO, M. A. and ALIKHANYAN, S. I., All-Union
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[Abstract] Plasmids that make up the P-1-group of incompatibility have several common features, including sensitivity to specific male, and resistance to specific female phages, dependence on the presence of phage B3 for heredity in Pseudomonas aeruginosa cells and conjugal

transfer subordinated to unrelated R38 plasmid. To confirm the genetic foundations of these and other patterns, the authors conducted hybridization and heteroduplex analyses of nucleotide patterns of R751, R906 and RP4. (The procedures are outlined in a materials and methodology section.) Results enabled identification and location of specific homology on physical and genetic charts of R751 and RP4. Procedures used in the analyses are summarized. Hybridizational analysis showed analogous structural organization in RP4, R751 and R906. The IncP-1-plasmids were found capable of inheriting features from a broad circle of gram-negative bacteria. Genetic determinants of hosts were localized in regions responsible for vitally important functions of RP4 plasmids, and by analogy, in such vital zones of DNA R751. A common ancestor for these plasmids probably determined the irregular evolutionary patterns observed, Figures 6; references 34: 5 Russian, 29 Western. [251-12131]

UDC 575.24:577.214.62:577.217.535:576.851.48

FUNCTIONING OF AMINO ACID OPERONS OF ESCHERICHIA COLI STRAINS WITH ALTERED TRANSCRIPTION AND TRANSLATION APPARATUS Report IV, EFFECT OF MUTATIONS THAT ALTER COUPLING OF TRANSCRIPTION AND TRANSLATION PROCESSES ON FUNCTIONING OF ILV-OPERON IN CELLS WITH *spoT* GENE MUTATION

Moscow GENETIKA in Russian Vol 19, No 9, Sep 83
(manuscript received 27 Dec 82) pp 1433-1438

GORDEYEV, V. K. and TURKOV, M. I., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Previous reports had shown that mutations that change the coupling of transcription and translation processes retarded depression of the *ilv*-operon of *E. coli* cells. The resistance mutation for streptomycin in *rpsL* genes, and to spectinomycin in *rpsE* genes, are among such effects. This led the authors to study resistance to antibiotics relative to depression of the *ilv*-operon in *spoT*-cells, and to compare the behavior of increased quantities of ppGpp in unfavorable conditions with cells having normally functioning *rel*-systems. Research was conducted with the strain NF930, which was isogenic to NF929 *rel+spoT+* and NF931 *relC spoT+*. The NF930 cells had mutations of *spoT1* that altered the enzyme ppGpp-pyrophosphohydrolase. Materials and experimental methodology are summarized. The *rel*-system was judged responsible for rapid synthesis of increased amounts of ppGpp in *E. coli* cells; the *rel*-system functioned closely with the translation apparatus, but these mutations did not affect the rate of *spoT*-cell adaptation, although mutations that altered the RNA-polymerase structure changed that rate in minimal media, especially those with large amounts of serine. In these conditions, the cells could not grow successfully. References 21: 4 Russian, 17 Western. [251-12131]

POPULATION GENETICS OF POPULACE OF EUROPEAN NORTH OF RSFSR Report VI.
DYNAMICS OF GENETIC LOAD

Moscow GENETIKA Vol 19, No 9, Sep 83

(manuscript received 3 May 82, final version 22 Sep 82) pp 1560-1565

REVAZOV, A. A., Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow

[Abstract] Socioeconomic transformation invariably leads to changes in population genetic parameters, especially changes in the pressure for natural selection. Factors of inbreeding in general are difficult to trace, and so it is more telling to study changes in mortality that may be related to population changes. The author uses the genetic load principle formulated by H. J. Muller (American Journal of Human Genetics, 1950 No 2, p 111) to study mutational and segregational genetic load, the first promoted by alleles, the second related to adaptation of heterozygotes as a result of balanced polymorphism. But theoretical considerations are easier than practical tests, which must accept such conventions as: harmful alleles function independently by probability, and, mortality due to genetics is independent of environment. Results indicate that the pressure of natural selection in the Arkhangelsk Oblast villages studied declined by more than one half from the 1930-50 period to the 1960-70 period. Reducing the pressure of natural selection and thus the segregational genetic load did not lead to accumulation of genes that reduce the adaptability of the populace. Methodological shortcomings of the study point to the need for continuing it. References 16: 6 Russian, 10 Western.
[251-12131]

UDC 547.963.9:547.858.9

GENE-DIRECTED MUTAGENESIS AND INDUCTION OF REPETITIVE NUCLEOTIDE SEQUENCES
IN PLASMID pBR322 Tc^r GENE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 83

(manuscript received 21 Jul 83) pp 197-201

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[Abstract] Induction of mutations in the Tc^r gene of plasmid pBR322 was evaluated in terms of its consequences on the primary structure of the DNA region in question. A 377 base pair fragment between restriction sites EcoRI and BamHI was isolated and a single-stranded DNA molecule prepared; subsequently, 4-5% of the bases were alkylated with N,N,N'-tri(beta-chloroethyl)-N'-(p-formylphenyl)-1,3-propylenediamine. Hybridization of this strand with superhelical pBR322 DNA and activation of the chloroethyl groups with

borohydride resulted in alkylation of the DNA target region in the Tc^r gene of the plasmid. Transformation of appropriate E. coli cells with the alkylated DNA led to identification of tetracycline-susceptible clones and eventually isolation of EcoRI-BamHI fragments from the mutant plasmids. The DNA fragments contained identical 7-8 base pair tandem repetitions in the area of the Tc^r promoter upstream of the transcription point. The induction of targeted mutations in the Tc^r gene was thus seen to lead to nucleotide sequence repetition in the gene, which was ascribed to D-loop formation in the palindromic region. Figures 3; references 10: 5 Russian, 5 Western. [278-12172]

UDC 577.1

CLONING AND EXPRESSION OF SV40 VIRUS IN SACCHAROMYCES CEREVISIAE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 83
(manuscript received 27 Jun 83) pp 211-213

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[Abstract] Standard approaches of genetic engineering were employed to clone and study the expression of SV40 DNA in *Saccharomyces cerevisiae*. Using the yeast replicative factor YEp 13, recombinant DNA molecules were prepared which contained the entire SV40 genome. The recombinant DNA molecules were then used for the transformation of *S. cerevisiae*. Expression of the viral DNA in the yeast cells was followed by the appearance of a 300 nucleotide pair RNA which hybridized with P-23 labeled DNA from SV40. In addition, complete function of the transcription/translation system was indicated by the synthesis of 7000 to 8000 dalton virus-specific proteins by the yeast cells, which corresponded in size to the complementary 300 nucleotide RNA. Figures 2; references 11: 1 Russian, 10 Western. [278-12172]

BACTERIOPHAGE T5 SYNTHETIC PROMOTER P₂₅ AND ITS FUNCTIONAL HYBRIDS WITH ESCHERICHIA COLI MODEL PROMOTER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 84
(manuscript received 24 Jun 83) pp 213-216

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[Abstract] A synthetic bacteriophage T5 promoter, P₂₅, was synthesized by the phosphotriester method and a mutant form of the synthetic promoter (P'₂₅) was used for the creation of hybrid promoters with E. coli model promoter (P_{mod}), the latter designated as P'₂₅/P_{mod} and P_{mod}/P'₂₅. Attempts at cloning P₂₅ were initially unsuccessful because with pBR322 as a vector the high level of expression of the tet gene yields products toxic to E. coli cells, and/or because transcription from P₂₅ occurs in the ori region and interferes with pBR322 replication. Cloning was achieved by using a number of pLZ vectors in which the tet gene is replaced by a semisynthetic gene for beta-galactosidase. P₂₅ and P_{mod} were identified as sharing an identical RNA polymerase binding site, but differ in the enzyme recognition site. Each of the synthetic promoters--P₂₅, P'₂₅/P_{mod} and P_{mod}/P'₂₅--showed a high level of in vivo activity in E. coli cells carrying the recombinant plasmids with these promoters. Figures 2; references 12: 4 Russian, 8 Western.
[278-12172]

UDC 577.1:547.96

CODON-ANTICODON COMPLEX MODEL AND MUTUAL DISPOSITION OF TWO tRNA MOLECULES ON RIBOSOME

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 84
(manuscript received 22 Apr 83) pp 229-232

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[Abstract] A new model has been advanced for the close packing of a peptidyl-tRNA and an aminoacyl-tRNA on a ribosome so that the complex of the two codons and the two anticodons forms a single double helix. In the proposed model the anticodon loops of both tRNA molecules are in the 3'-stacking configuration and arranged so that the 34th base of the peptidyl-tRNA, i.e., the wobble position of the anticodon, and the 37th base of the aminoacyl-tRNA do not interfere with each other and thereby possess the structural parameters reminiscent of the A form of RNA. The 34th base of the peptidyl-tRNA and the 37th base of the aminoacyl-tRNA lie in one plane fitting into the stacking arrangement with the 36th and the 38th base of the aminoacyl-tRNA and

and the 35th base of the peptidyl-tRNA. The structure proposed for the codon-anticodon complex results in approximation of the CCA-ends and in the virtually perpendicular disposition of both tRNA molecules. Figures 3; references 11 (Western). [278-12172]

HUMAN FACTORS

UDC 658.5.012.011.65

OPERATOR RESPONSE TIME AS PSYCHOLOGICAL FACTOR IN AUTOMATED CONTROL SYSTEMS OF TECHNICAL OPERATIONS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, 1983
(manuscript received 20 Apr 82) pp 28-29

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[Abstract] A mathematical evaluation was made of the psychological factors in operators responsible for technical processes in terms of the relationship between the quality of instructions received and the response time. The second signal system has been identified as a key link in determining response times and its efficiency can be evaluated by the decrement in response time following adequate instructions. Inadequate instructions have no effect on the response time. Studies at a metallurgical establishment have shown that operators receiving appropriate instruction have demonstrated a reduction in the response on the order of 20-30%, indicating more efficient performance. Figure 1; references 5 (Russian).
[293-12172]

UDC 616.98:579.843.95]-078.731

ENZYME-LINKED IMMUNOSORBENT ASSAY [ELISA] IN PLAGUE DIAGNOSIS

Moscow IMMUNOLOGIYA in Russian No 6, Nov-Dec 83
(manuscript received 1 Mar 82) pp 74-76

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[Abstract] A study was conducted on the application of ELISA (enzyme linked immunosorbent assay) to the detection of fraction I antigen of the plague bacillus in the tissues of the Mongolian pika and an inanimate objects. Comparison of the results obtained with ELISA and standard serological and biological methods pointed to the high sensitivity and specificity of ELISA, using antibodies induced in chinchilla rabbits and alkaline phosphatase or horseradish peroxidase. In general, ELISA yielded a higher percentage of positive results than passive hemagglutination and immunofluorescent techniques. Technical details are provided which rendered ELISA applicable to the detection of the plague antigen, including the use of a pH 9.0 carbonate-bicarbonate buffer. Figure 1; references 15: 2 Russian, 13 Western.
[302-12172]

UDC 577.27

INTERACTION OF LIGHT IMMUNOGLOBULIN CHAINS WITH IMMOBILIZED HEAVY CHAINS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 84
(manuscript received 27 Jun 83) pp 202-206

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[Abstract] Studies on binding were conducted for the interaction of homologous and heterologous L and H chains to determine the factors that may

enter into the formation of an immunoglobulin antigen-binding site. Using a pool of normal L chains (L-N) from August mice and H chains obtained from mouse myeloma MOPC 21 (H-21) immobilized on diazocellulose, radioligand binding studies showed that 35% of the radiolabeled L-N chains were bound to the H-21 chains. However, in a competitive binding assay using unlabeled L-N and radiolabeled myeloma MOPC light chains (L-21), only 29% of the unlabeled L-N chains were bound, presumably because the lowest affinity L-N chains were excluded from reacting with H-21 by the L-21 chains. Chromatography of the L-N pool on CM-cellulose yielded five fractions showing 16 to 60% chain binding, with equilibrium constant 1.7- to 6.3-fold lower than the equilibrium constant of 2.8×10^{-8} M for the reaction of L-21 and H-21. These preliminary results indicate that, at the very least, not every L chain is capable of reaction with a given H chain and participate in the formation of what may approximate an antigen-binding site. Figures 3; references 10: 2 Russian, 8 Western.
[278-12172]

LASER EFFECTS

UDC 616.72-002.77-039+616.71-007.24+616.72-02:616.517]-085.849.19

LASER THERAPY AND LASER PUNCTURE IN RHEUMATOID ARTHRITIS, DEFORMING OSTEOARTHRISIS AND PSORIATIC ARTHROPATHY

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 55, No 7, Jul 83
(manuscript received 23 Feb 83) pp 92-97

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[Abstract] The effectiveness of laser therapy was investigated in the case of 245 patients with rheumatoid arthritis, deforming osteoarthritis or psoriatic arthropathy, using a red helium-neon laser (632.8 nm emission, 0.22 mW/cm², 15-20 sessions of 5-7 min each) irradiation alone, or in combination with laser puncture. Furthermore, 30 patients with psoriatic arthropathy were treated with UV laser (337.15 nm, 15-20 sessions, 10-15 min per session) following photosensitizer administration (psoralen, per os or topical). Following irradiation and laser puncture of the affected joints both clinical and laboratory studies attested to the effectiveness of laser therapy. Laser therapy was found to exert an analgesic and an anti-inflammatory effect, improved regional circulation and normalized synovial membrane permeability. The combination of laser irradiation and laser puncture was more effective therapeutically than external laser irradiation alone. Figure 1; references 22: 14 Russian, 8 Western.
[264-12172]

LASER THERAPY FOR RHEUMATOID ARTHRITIS: CLINICAL AND MORPHOLOGIC ASPECTS

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 55, No 7, Jul 83
(manuscript received 24 Jan 83) pp 97-102

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[Abstract] A double blind study was conducted on 30 patients with rheumatoid arthritis to test the effectiveness of laser therapy in this condition. The affected joint(s) were irradiated with a helium-neon laser (632.8 nm, 1-1.5 mW/cm²) or, as a placebo, red light. Patients treated with the laser reported a significant alleviation of pain, morning stiffness, and improvements in mobility and strength of the affected joints. Treatment with the placebo was without noticeable benefit. Evaluation of biopsy material obtained from the synovia of knee joints demonstrated that laser treatment decreased exudate formation and inflammatory infiltration, and enhanced fibroblast activity. Figures 3; references 7: 6 Russian, 1 Western.
[264-12172]

UDC 617:615.849.19.03]:008

LASER APPLICATIONS TO SURGERY

Moscow KHIRURGIYA in Russian No 3, Mar 83
(manuscript received 30 Jun 82) pp 15-18

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[Abstract] The authors summarize the history of the development of surgical instruments from scalpels to modern lasers, which have the advantages of precision, immediate coagulation and sterility, the latter because of the absence of any mechanical contact. The CO₂ laser has come to be preferred over earlier ruby, argon and neodymium glass lasers. Laser operations include gastrointestinal resections, bile system and glands, as well as plastic surgery and infectious operations. Burn treatment and skin infection removal are conducted with greater effectiveness, reducing treatment time and eliminating complications. Uses in stomatology, gynecology and urology are expanding. Clamping and suturing procedures are being done with laser technology, and modern instruments being developed in the USSR promise further advances for cardiovascular, pulmonary and other surgery. References 15: 7 Russian, 8 Western.
[256-12131]

PROSPECTS OF GAS LASER APPLICATIONS TO SURGERY

Moscow KHIRURGIYA in Russian No 3, Mar 83
(manuscript received 24 Jun 82) pp 19-21

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imeni P. A. Gertsen

[Abstract] Constant beam CO₂ lasers that can be focussed to as little as 0.3 mm have come to be preferred for surgical uses since they have sufficient power and mobility for a broad range of applications, including section and removal of tissue, coagulation and excision of infected tissue, such as benign and malignant tumors, burned tissue, carbuncles, etc. Minor inflammations following laser surgery are more than balanced by promotion of healing and instant coagulation brought by the laser beam. Light guide improvements with CO₂ laser wave length of 1.5-1.7 mcm are eliminating earlier problems with loss of power related to this procedure. Recent research at the authors' institute has succeeded in using a 5 mcm wave length, which offers prospects for broader applications in surgery involving use of fiber optics.

[256-12131]

UDC 616.329/.33-089:615.849.19

LASER APPLICATIONS IN SURGERY OF ESOPHAGUS AND STOMACH

Moscow KHIRURGIYA in Russian No 3, Mar 83
(manuscript received 22 Jan 82) pp 21-25

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Moscow Medical Institute imeni I. M. Sechenov

[Abstract] Development of powerful constant beam lasers has brought great advances in surgery. The authors summarize those advances and problems that have arisen during them. Thoracic surgery was originally hampered by bulky equipment and the blocking effect of blood when larger vessels were cut. Methods for evacuating blood from operative organs, developed by O. K. Skobelkin and collaborators, and advances in equipment in general, have eliminated such problems. The domestic Soviet laser "Scalpel 1" has been used since 1980 for resectioning the large and small intestines, with a "welding" function that prevents bleeding and aids in rejoining the tissue. This same effect to a lesser degree has been observed in esophagus and stomach surgery. The authors describe equipment and methodology for resectioning the stomach and plastic surgery of the esophagus using stomach tissue or

a section of the large intestine as a transplant. Of 117 operations of these types, only 5 fatal complications occurred, none of which were attributed to the laser procedures. More sophisticated mass-produced laser apparatus is needed to expand the number of surgical applications. References 17: 9 Russian, 8 Western.
[256-12131]

UDC 617-001.17-089:615.849.19

USE OF CONSTANT BEAM CO₂ LASER IN BURN TREATMENT

Moscow KHIRURGIYA in Russian No 3, Mar 83
(manuscript received 29 Apr 81) pp 25-29

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[Abstract] Surgical burn treatment involving progressive necrectomy and subsequent plastic surgery of granulated injuries previously long, required periods of treatment that were fraught with opportunities for infection and other complications. The authors report on their experience with laser removal of burn-injured tissue, ranging in extent from 1% to 15% of body area. They used domestic Soviet lasers "Scalpel 1" or LGM-2 with a wave length of 10.6 mcm. Results showed that the necrectomy procedures was practically bloodless and largely free of infections because of the contact-free nature of laser surgery. Burned tissue was removed in strips, and, where possible, skin from other body areas used over granulated wounds as a base for new skin formation. The limited history of such procedures has shown greatly reduced treatment times, elimination of graft rejections and generally positive outcomes. Figures 5; references 10: 3, Russian, 7 Western.
[256-12131]

CO₂ LASER IN COMPREHENSIVE TREATMENT OF PURULENT DISEASES AND INJURIES OF
SOFT TISSUE

Moscow KHIRURGIYA in Russian No 3, Mar 83
(manuscript received 15 Oct 82) pp 29-32

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[Abstract] The authors discuss 8 years of experience with domestic Soviet lasers "Scalpel 1" and "Romashka" in treating purulent diseases and wounds. They have found that the laser minimizes tissue trauma and infection spread, while making clean excision of purulent tissue and providing a promising base for healing. Most of the infections (74%) were staphylococcic, with a significant incidence of E. coli (11%) and Bacillus pyocyaneus (8%). Removal of the affected area from healthy tissue and early intervention at the time of inflammation, with high-powered lasers of up to 100 watts, are discussed. Post-operative processes were largely aseptic healing inflammations, macrophagic and fibroblast cell proliferations, with an absence of neutrophil inflammatory infiltrations. Wounds could be closed earlier, individualized cleansing procedures were more effective and treatment periods were reduced markedly. Figure 1; references 7: 4 Russian, 3 Western.
[256-12131]

UDC 616.34-085.849.19

USE OF CO₂ LASER FOR TREATING PROCTOLOGICAL AILMENTS

Moscow KHIRURGIYA in Russian No 3, Mar 83 pp 108-110

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[Abstract] The authors report on their use of the domestic Soviet laser "Scalpel 1" for treating internal and external hemorrhoids, intestinal polyps and other proctological disorders. Preoperative procedures for cleaning, administration of local anesthesia and specific procedures of operations are outlined. A grooved probe was used to guide the laser in the rectum and intestines. The laser scalpel was used successfully to treat all the proctological disorders indicated, with greater efficiency, shorter healing periods and less contamination than traditional methods. References 8: 6 Russian, 2 Western.
[256-12131]

USE OF CO₂ LASER IN PURULENT SURGERY

Kazan KAZANSKIY MEDITSINSKIY ZHURNAL in Russian Vol 64, No 6, Nov-Dec 83
p 452

KIPENSKIY, A. A. and SAVEL'YEV, S. V., Kazan

[Abstract] Laser surgery has become very common due to its advantages of low traumatism, good hemostasis, antiseptic and analgesic properties. The present article reports on the positive results of 91 laser operations on purulent wounds, carbuncles, benign tumors, etc., including 5 diabetic patients with endarteritis of the lower extremities or other complications. Surgery with the domestic Soviet "Scalpel 1" laser after, as a rule, general anesthesia, resulted in less blood loss, shorter operating time and quicker healing. Where skin grafts were involved they were begun sooner and took hold readily. While the advantages of laser surgery for diabetics were less impressive, they still permitted more rapid treatment than traditional surgery. No complications traceable to the laser procedure were observed, and length of hospital stays was reduced from an average of 14.6 days to 11.1 days.

[276-12131]

MARINE MAMMALS

EVALUATION OF PHENETIC RELATIONSHIPS OF DOLPHIN CLASSIFICATIONS BASED ON ANALYSIS OF NONMETRICAL CRANIAL VARIATIONS

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 62, No 12, Dec 83

[Article by A. V. Yablokov, U. F. Perrin, M. V. Mina]

[Text] The nonmetrical variations of 31 characters were studied in five sample groups (185 skulls) of Stenella attenuata and in two sample groups (34 skulls) of S. longirostris, taken from the Pacific Ocean near the shores of southern Mexico and Central America. The sample groups were compared according to 15 characters, whose variations were independent of sex and age of animals. A generalized evaluation of the phenetic similarity of the sample groups was made using the "index of similarity", suggested by Zhivotskiy (1982). The S. attenuata sample groups, taken far from coastal areas, are united and stand apart from the "coastal" sample groups. The S. longirostris sample groups differ from each other more than any two S. attenuata sample groups. The discriminative importance of the characters is discussed.

In population biology the analysis of discrete, mostly nonmetrical characters has been developed during the past two decades to evaluate the phenetic (environmental-genetic) relationships between intraspecific classifications of animals. The study of nonmetrical cranial variations in a number of rodent, primate, predatory and pinniped species has shown that many characters of this category may be used as markers of the nonotypical composition of a population, as a result of which the singling out of aggregates of characters of genetically similar animals and an analysis of the relationships of these aggregates become feasible (Berry, Searle, 1963; Berry, 1977; Sjøvold, 1977; Hartman, 1980; Larina, Eremina, 1982; Bol'shakov, Vasil'ev, 1975 et al.; for survey see Yablokov, 1980).

Attempts have been made to use the nonmetrical variations in postcranial cetacean skeletons for the same purposes. (Bel'kovich, Yablokov, 1965; Berzin, Veinger, 1982).

The study of nonmetrical cranial variations in cetaceans from a population-morphological aspect has become feasible on a fairly large body of material due to the fact that since 1968 coworkers of the Southwest Fisheries Center of the U.S.A. have been assembling a collection of skulls of dolphins of the Stenella genus (S. attenuata, S. longirostris), which perished during tuna fishing in the Pacific Ocean (Perrin, 1969).

The goal of our study included identification of the nonmetrical cranial variations in S. attenuata and S. longirostris, development of a method for analyzing these variations, evaluation of dependence of characters on age and sex of animals, elucidation of phenetic relationships of spacially dissociated classifications of animals of one species and different species and, also, a comparison of the obtained results with study results of variability of these species according to other characters (Perrin, 1975 a).

The material used in this study included skulls of 185 S. attenuata specimens (5 sample groups) and skulls of 34 S. longirostris specimens (2 sample groups), which perished during tuna fishing in the waters of South Mexico and Central America (Fig. 1). The greater part of this material is found at the National Museum of Natural History in the U.S.A. (Washington), and the rest--at the Museum of Natural History in San Diego and at the Southwest Fisheries Center Administration, U.S.A. (California).

The nonmetrical cranial variations, similar to those which were singled out by researchers dealing with mammals of other orders, were singled out in the first stage of the study (Berry, Searle, 1963; Berry, 1963, 1969; Hilborn, 1974; Rychkov, Movsesyan, 1972, Turutina, 1982 et al.). It was found that for a number of characters the development of an evaluation system according to two state ("present-absent") has been unsuccessful so far. In phenetic analysis the use of characters, some of which may be described by two states, and others by a greater number of states (variants), is combined with certain methodical difficulties (Sjovold, 1977). These difficulties may be overcome with use of the index of similarity, suggested by Zhivotitskiy (1979, 1980, 1982). If in one of the compared sample groups the frequencies (parts) of actual variants (states) of a character constitute $p_1, p_2 \dots p_m$, and in the other sample group respectively $q_1, q_2 \dots q_m$, then the index of similarity is

$$r = \sum_{i=1}^m \sqrt{p_i \cdot q_i}. \text{ The reliability of differences is estimated}$$

with the help of the identity criterion

$$I = [8N_1N_2/(N_1 + N_2)] \cdot [1 - r - (p^0 + q^0)/4],$$

where N_1 and N_2 --number of animals in the compared sample

groups, p --sum of state frequencies, represented in the first sample group and not represented in the second, q^0 --sum of state frequencies, represented in the second sample group and not represented in the first. Value I is distributed as χ^2 with $m-1$ degrees of freedom.

With analysis of n statistically independent characters the mean similarity was estimated by value $\bar{r} = 1/n(r_1 + r_2 + \dots + r_n)$ for which $\frac{I}{n} = \frac{I_1}{n} + \frac{I_2}{n} + \dots + \frac{I_n}{n}$ (number of degrees of freedom $df = m_1 + m_2 + m_3 + \dots + m_n - n$).

The possibility of establishing a clear correspondence between each specimen and specific state of a given character was evaluated, by the first two authors of this article, for each earlier singled out character. If such a correspondence could not be established, the character was excluded from further examination. Only those characters which could be determined for all available sample groups were subjected to further detailed analysis. Specifically, all nonmetrical variations of the mandible and teeth of the maxilla were excluded from examination. As a result, the total number of characters, which were examined comparatively, was 31. When there was a bilateral arrangement of structures, characters were taken from the left side of the cranium for this analysis. A complete description of all the singled out characters and, also, complete data on age and sex composition of the individual sample groups were published earlier (Perrin et al., 1982).

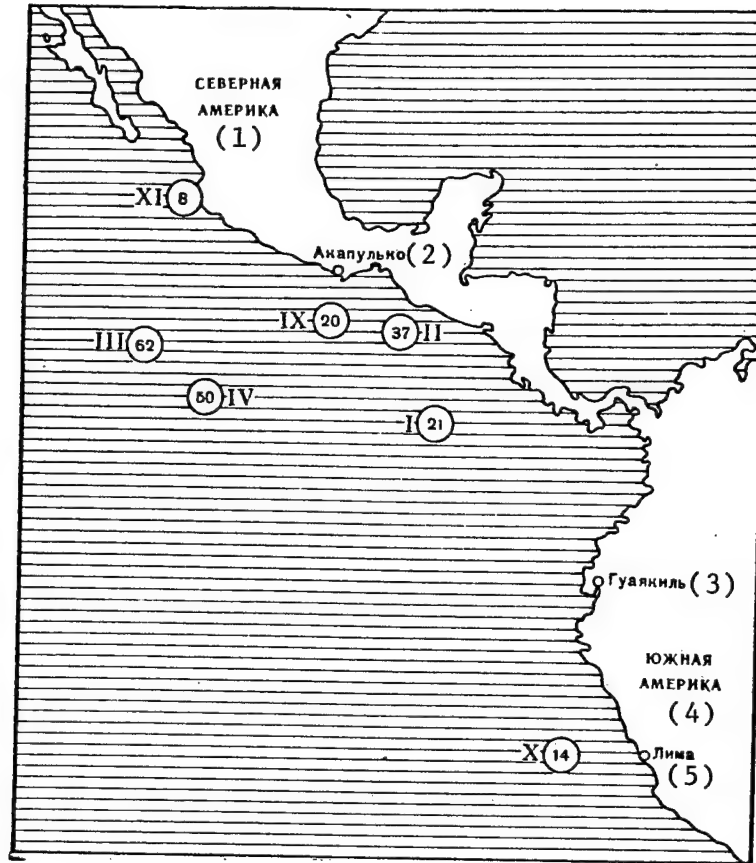


Fig. 1. Areas from which the studied sample groups of *Stenella attenuata* and *S. longirostris* were taken (according to Perrin et al., 1982); Roman numerals-- numbers of sample groups, Arabic--number of animals in sample groups.

- (1) North America (2) Acapulco (3) Guayaquil
(4) South America (5) Lima

Description of Characters

1. Position of openings for middle branch of the intraocular nerve (foramen infraorbitale mediale) in relation to level of the anterior border of the preocular processes: at level of line "a" (Fig. 2, A), in front or back.
2. Position of openings for lateral branch of the intraocular nerve (for. infraorbitale laterale) in relation to level of anterior border of the preocular processes: at level of line "a" (Fig. 2, A) in front or in back.

3. Relative position of right and left openings for lateral branches of the intraocular nerve: at same level in relation to cranial longitudinal axis, left front, right front.
4. Position of canal opening of lateral branch of the intraocular nerve: may be probed (may not be probed) vertically.
5. Number (0-5) of openings for rostral branches of the maxillary nerve (for. maxillare superius) toward the front of the lateral branch opening of the intraocular nerve.
6. Number (0-3) of openings for branches of the facial artery, running together with the terminal branches of the ocular nerve (for. zygomatico-faciale) behind the anterior border of the nasal bone (line "b" in Fig. 2, A).
7. Number and position of notches on os praemaxillare in the anterior border of the nasal bone, through which os maxillare is seen: 1) no notches; 2) notch appearing at the same time on the medial and aboral border of os praemaxillare; 3) notch only on the medial border (Fig. 2, A, fen); 4) spherical notch, does not appear on the borders of the bone (Fig. 2, A, fen); 5) combination of variants 2 and 3; 6) notch on the aboral border together with variant 2; 7) combination of variants 2 and 4.
8. Development of crest (crista mesethmoidalis) at the anterior border of the nasal bone; the crest reaches (or almost reaches) the dorsal surface of os praemaxillare or appreciably lower than this level.
9. Presence (absence) of contact between os maxillare and os occipitale at the point where the occipital crest intersects the temporal fossa (Fig. 2, A, c). Contact is considered absent when distance between the bones at this point is more than 1 mm.
10. Presence (absence) of contact between os praemaxillare and os nasale (Fig. 2, A, d). Contact is considered absent when distance between the bones is more than 1 mm.
11. Left border of external nasal bone at level of os praemaxillare ending (Fig. 2, A, e), viewed from above, is formed: only os praemaxillare or os maxillare and os praemaxillare.
12. Presence (absence) of anterior orbital notch (Fig. 2, A, f).
13. Inferior border of the zygomatic process (processus orbitalis anterior), when viewed from the side, is formed: only os lacrimale; os lacrimale and os frontale; os lacrimale and os maxillare.

[14 is missing]*

*Translator's note: the article speaks of 31 characters but the list has 1-32 (error in numbering, 14 was left out).

15. Occipital crest (protuberantia occipitalis medialis) (Fig. 2, B, p. o. m) at level of the middle of the occipital tubers when checked with ruler edge, either reaches (or exceeds) this level or does not reach this level.
16. Presence (absence) of an additional occipital opening (for. occipitale accessorium) over the large occipital opening (Fig. 2, B, f. o. a).
17. Presence (absence) of vertical notch on the dorsal side of the occipital opening (Fig. 2, B, i. f. m).
18. Number (0-3) of perforations of the occipital bone laterally from the condyle (Fig. 2, B, f. o. l).
19. Number (0-2) of perforations of the occipital bone in the area of the occipital tuber (Fig. 2, B, f. o. s).
20. Position of end teeth (center of last tooth or last alveolus) from each side in relation to the anterior border of the os palatinum: at the level, in front or in back (Fig. 2, C, a).
21. Arrangement of openings for internal branches of the maxillary nerve (for. maxillaria interna) from each side: at level of the anterior border of os palatinum, in front or in back of this level (Fig. 3, C, f. m. i. b).
22. Number of large (more than 1 mm in diameter) openings for branches of the maxillary nerve (for. palatina majora) on the boundary between os maxillare and os palatinum from each side.
23. Presence (absence) of contact between pterygoid processes (hamuli pterygoidei) at the anterior border of the choana (Fig. 2, C, c). Contact is considered absent when distance between the bones is more than 1 mm.
24. Presence (absence) of union of pterygoidei processes in their anterior section. Union is considered absent when distance between the bones is more than 1 mm.
25. Presence (absence) of bony palate crest (crista palatina) in the space between the pterygoidei processes (Fig. 2, C, c. p).
26. Shape of posterior section of pterygoidei processes: elongated (width of the basic process is smaller than its length, Fig. 2, C, pt, at the left).
27. Presence (absence) of perforations in the posterior section of hamuli pterygoidei (Fig. 2, C, fen. h).
28. Shape of posterior border of os basisphenoidale (6 variants, see Fig. 2, C, d).
29. Shape and position of lateral openings on os basisphenoidale (8 variants, see Fig. 2, C, e).

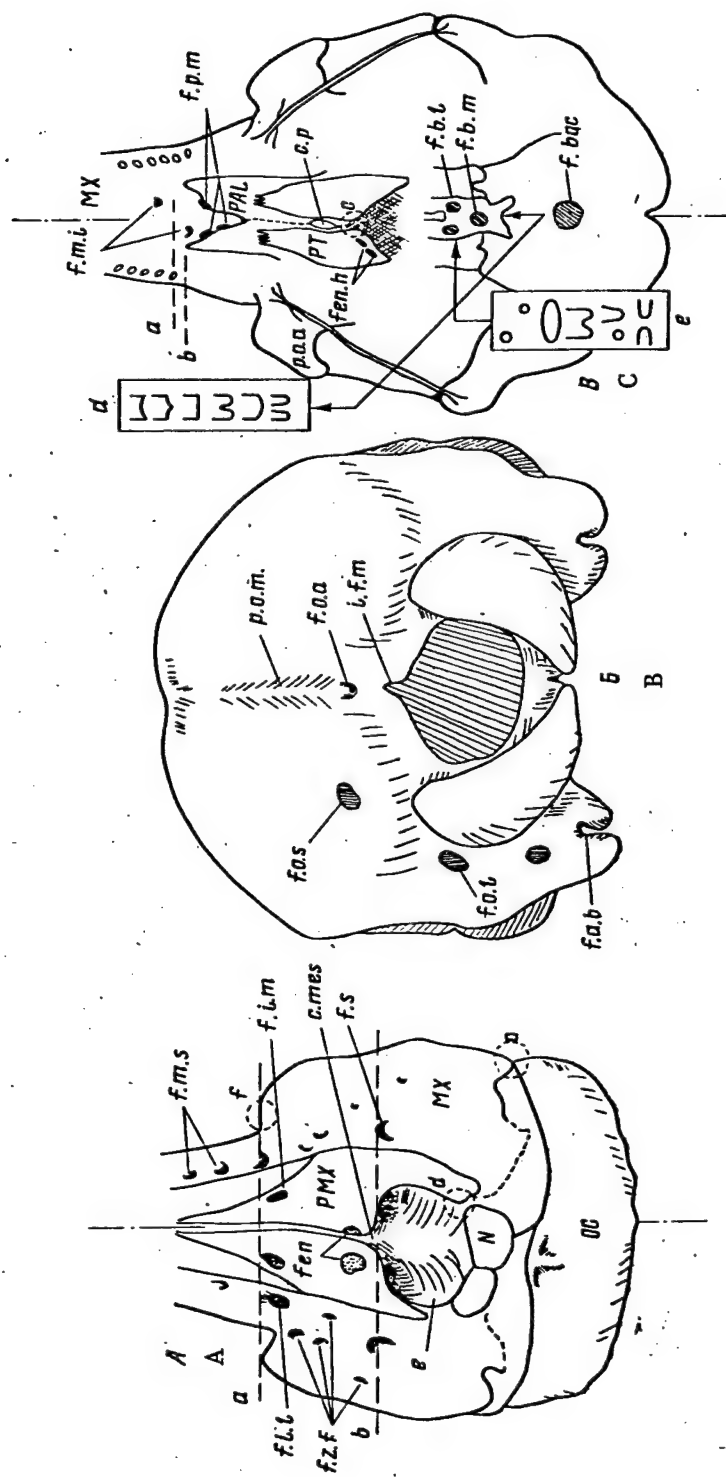


Fig. 2. Location of basic studied characters on dorsal (A), occipital (B) and ventral (C) cranial surface (different variants of individual characters on right and left halves of cranium are shown): MX--os maxillare, N--os nasale, OC--os occipitale, PAL--os palatinum, PMX--os praemaxillare, PT--os pterygoideum (hamulus), c. mes--crista mesthoidalis, c. p--crista palatina, fen--fenestrae praemaxillares, fen. h--fenestrae hamuli pterygoidei aboralis, f. b. l--fen basiphenoidealalis lateralis, f. b. m--fen. basisphenoidealalis medialis, f. b.c--fen. basioccipitalis, f. p. m--for. palatina majora, f. m. i--for. maxillaria interna, f. o. a--for. occipitale-accessorium, f. a. b--for. arteriale basilare, f. o. l--fen. occipitalis lateralis, f. o. s--fen. occipitalis superior, f. i. l--foramen infraorbitale laterale, f. i. m--for. infraorbitale mediale, f. m. s--for maxillare superior, f. s--for. supraorbitale, f. z, f--for. zygomatico-faciale, i. f. m--incisura foraminis magni, p. o. a--proc. orbitalis anterior, p. o. m--protuberantia occipitalis medialis; a--f--see description of characters in text.

30. Presence (absence) of central opening (fen. basisphenoidalis medialis) on os basisphenoidale (Fig. 2, C, f. b. m).

31. Nature of perforation of os basioccipitale: from 0 to 3 openings in different combinations (Fig. 2, C, f. boc).

32. Presence (absence of for. arteriale basilare in the jugular fossa is seen when viewed from behind-below (Fig. 2, B, f. a. b).

Analysis of Dependence of Characters on Sex and Age of Animals

Using sample group IV of S. attenuata, including the highest number of adult animals, we compared adult males ($\bar{n} = 16$) and adult females ($\bar{n} = 12$) according to each character. In those cases when reliability of difference, determined by criterion I, was found to be lower than threshold value ($X^2_{0.05}$), a comparison of adult animals was conducted (males and females together) with sexually immature animals¹ ($\bar{n} = 22$).

Reliable differences between males and females were found according to two characters (23 and 32). Such differences between sexually immature males and females were found according to one character (11).

Reliable differences between adult and sexually immature animals were found according to 11 characters (1, 7, 9, 12, 19, 20, 22, 27, 28, 29, 31).

Dependence of characters on sex and age of S. longirostris animals was characterized by uniting sample groups IX and X, as a result of which the compared groups included 17 (adult males), 12 (adult females) and 6 specimens (sexually immature animals). Only those characters were analyzed for which no dependence on sex and age were found in S. attenuata. Reliable differences between adult males and females were found according to character 6, and between adult and sexually immature animals--according to character 13.

Thus, 15 characters were found suitable for comparison of sample groups, representing spacially dissociated classifications (herds) of dolphins.

Comparison of Spacially Dissociated Sample Groups

On the basis of similarity evaluations between S. attenuata sample groups, presented in the Table, sample groups I, II, III and IV were united into a compact group and from these sample group XI was formed (Fig. 3). The two available S. longirostris sample groups (IX and X) reveal less similarity to each other than any two S. attenuata sample groups (Table). In all paired comparisons the differences between the sample groups for the aggregate of 15 characters are reliable, and in comparisons of sample groups I and II with sample group XI $0.01 < p < 0.05$, in the rest of the cases, $p < 0.01$.

¹Determination of sexually mature and sexually immature animals was based on the degree of fusion of the maxillae and praemaxillae on the rostrum (Perrin, 1975).

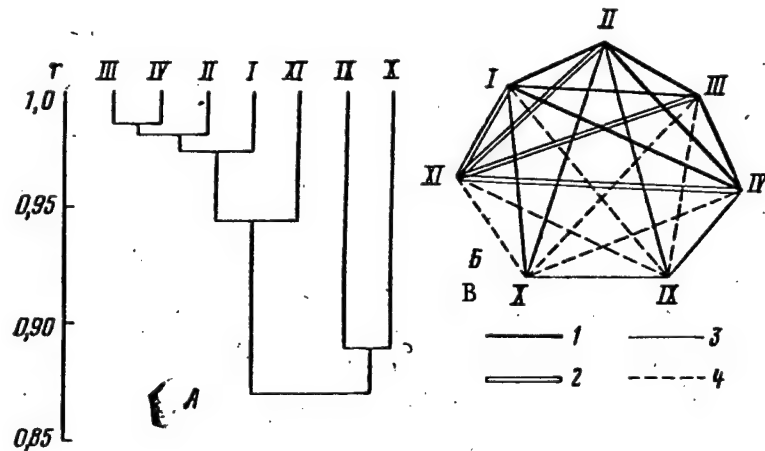


Fig. 3. Dendrogram, constructed by a simply-connected method (A) and drawing (B), representing the phenetic relationships of the studied sample groups: 1- \bar{r} from 0.96 to 1.00; 2 - \bar{r} from 0.91 to 0.95; 3 - \bar{r} from 0.86 to 0.90; 4 - \bar{r} from 0.81 to 0.85; sample groups are denoted by Roman numerals.

On the whole, it may be stated that there is a great similarity, according to the studied selection of characters, between S. attenuata and S. longirostris, and the group of sample-groups I-IV is closer to S. longirostris phenetically than sample-group XI (Table, Fig. 3).

The data presented above indicate that small nonmetrical variations, pertaining basically to the shape of individual details of various bones of the facial and cerebral cranium, presence and location of openings for nerves and blood carrying vessels and, also, congenital perforations of individual bones (basically of the cerebral cranium), common in the craniums of rodents, primates, predatory and pinniped species, are also found in the craniums of cetaceans and, in all probability, may characterize specific natural classifications of animals by their frequencies of occurrence.

At the same time, the conducted analysis showed that, with use of nonmetrical cranial variations for evaluation of the phenetic relationships of the compared individual groups of dolphins, the possible dependence of such characters on age, and some-on sex of animal has to be taken into consideration.

Table

Averaged evaluations of similarity (\bar{r}) and values of identity criterion (I) for sample groups of Stennella attenuata and S. longirostris according to 15 nonmetrical cranial characters*

Sample groups	I	II	III	IV	IX	X	XI
I		0,971	0,974	0,975	0,845	0,856	0,943
II	$\frac{42,91}{21}$		0,977	0,982	0,870	0,865	0,940
III	$\frac{35,32}{21}$	$\frac{51,22}{23}$		0,984	0,850	0,842	0,939
IV	$\frac{41,98}{21}$	$\frac{50,86}{21}$	$\frac{78,34}{23}$		0,858	0,855	0,931
IX	$\frac{176,47}{20}$	$\frac{152,59}{22}$	$\frac{224,91}{23}$	$\frac{205,25}{22}$		0,890	0,815
X	$\frac{128,75}{20}$	$\frac{141,32}{21}$	$\frac{138,45}{22}$	$\frac{165,84}{21}$	$\frac{100,30}{20}$		0,846
XI	$\frac{32,01}{19}$	$\frac{38,38}{21}$	$\frac{40,22}{19}$	$\frac{49,86}{21}$	$\frac{95,15}{20}$	$\frac{58,69}{19}$	

*Above the line--evaluations of \bar{r} , below the line for each comparison above the line--values of I, under the line--number of degrees of freedom.

The obtained results allow us to speak of greater individualization in the coastal classifications of S. attenuata than in open sea classifications as compared to individualization of individual groups (herds) of open sea dolphins from each other. Moreover, it may be assumed that dolphin herds of the open sea, represented in our material, are not long existing, isolated, self-reproducing classifications--are not individual populations in the genetic-evolutionary sense of the word.

The level of phenetic (and, supposedly--genetic) similarity of S. longirostris herds, living to the north and south of the equator, is such that there is a basis for the conclusion about their significant genetic dissociation. In any case, the magnitude of differences between them exceeds the level of differences between the coastal and "oceanic" S. attenuata groups.

All data on the similarity and differences between the classifications, obtained with analysis of nonmetrical cranial variations of the studied species of dolphins, completely coincide with the results obtained in comparing cranial sizes and proportions, and also with the special color characteristics of animals in these groups (Perrin, 1975, 1975a). This circumstance may be considered as a confirmation of the feasibility of using phenetic distances for the objective study of intraspecific variability of cetaceans.

The method of analysis used for the obtained data, unfortunately, did not allow for the singling out of related groups of animals (type of family

classifications) within the individual herds. That such classifications may be identified was suggested by one of the authors of this article (A. V. Yablokov); this is done with visual analysis of the collection material, based on significant similarity between certain animals according to the nature of small variations. In the future it would be interesting to analyze the available materials, as well as additional material, according to non-metrical cranial variations of cetaceans with the special purpose of searching for characters that may show similarity (relationship) of individual animals.

The conducted analysis of nonmetrical characters allows us to make some general remarks concerning further development of the phenetic approach for analysis of intra- and interspecies variability. The characters that we studied are known to have different "discriminative" importance which identifies to a different degree the differences between compared groups of animals. This confirms the concept of the varying "phenetic scale" of the different character (Yablokov, 1980).

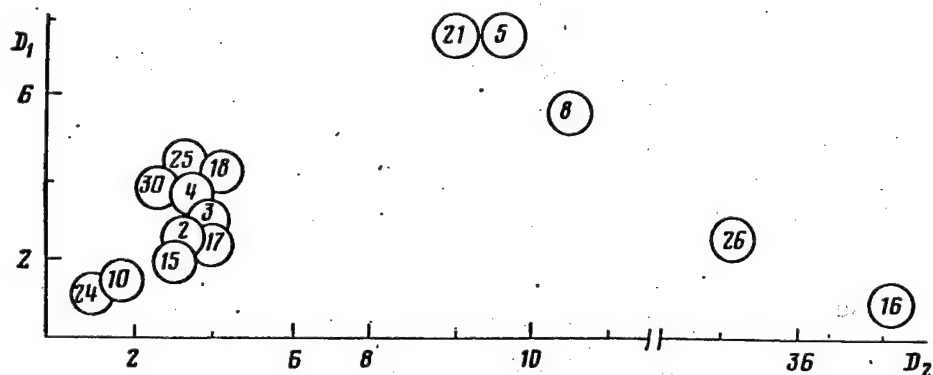


Fig. 4. Relationship of D values, characterizing the discriminative importance of characters:
 D_1 --in the group of S. attenuata samples;
 D_2 --in the groups of S. attenuata and S. longirostris samples.

$$D = 100 \cdot \sqrt{\frac{\sum (\bar{x} - r_i)^2}{n - 1}}$$

The selection of characters, most valuable for the solution of problems of a specific study, is a very important task, success in the resolution of which may determine the outlook for the use of nonmetrical variations as a whole. In the first approximation, we tried to evaluate the discriminative importance of characters by the dispersion magnitude of the r values, obtained in paired comparisons of sample groups for a given set. Such evaluations were calculated for all seven sample groups of both species and separately--for five S. attenuata sample groups. As could be expected, the different characters were found to be most important in analyzing sample groups,

different in composition (Fig. 4). It was also found that the discriminative importance of characters varies greatly. From these results at least two conclusions follow. First, in describing the phenetic relationships of intraspecific classifications of different species (even those quite close to each other) one cannot be certain ahead of time that the characters, good for differentiating the classifications of one species, will be as good for differentiating the classifications of another species. Second, since the characters used by us were selected without preliminary evaluation of their discriminative importance, it is logical to assume that in the future, having obtained such an evaluation, the selection of nonmetrical characters, characterizing more accurately the phenetic relationships of the studied classifications, will be singled out successfully in each case.

In summing up this study we shall point out, first of all, that the fact of discovering such nonmetrical cranial variations in cetaceans, which may be subjected to population-morphological analysis, is interesting in itself.

The method, suggested by L. A. Zhivotskiy, proved to be a simple and adequately effective method of evaluating the degree of similarity according to polymorphous characters in processing the available and still comparatively small number of studied animals and individual sample groups of material according to the nonmetrical cranial variations of cetaceans. We assume that this method may be widely used for the solution of population-morphological problems on similar material and for other groups of animals.

At the present time it is difficult to assess the outlook for the use of nonmetrical cranial variations in the identification of phenetic (and genetic) relationships of specific and intraspecific classifications of cetaceans in general and dolphins in particular. However, the results presented above allow us to consider that this approach may be, at least, an important addition to the standard approach, used for these purposes, of analyzing plastic, meristic and other quantitative characters.

This study was conducted within the framework of the project "Marine Mammals" of the Intergovernment Agreement of the USSR-U.S.A. for Protection of the Environment, 1972. We are thankful to V. A. Zemskiy, Yu. E. Kazakov, S. G. Cole, R. V. Miller, L. A. Popov, V. Silverman, V. I. Stepakov and others who helped make this project study a success. We are also grateful to Geo. M. Coe, V. Oliver, B. G. Bargo and D. Geo. Trudeau, who collected the greater part of the studied materials, and also to the owners, captains and crews of the fishing boats, "Carol Virginia", "Eastern Pacific", "Independence", "King Oscar" and "Lois Seaver", without whose cooperation collection of the material would have been impossible. Finally, we are thankful to Geo. G. Meade (National Museum of Natural History, Washington) and to A. Rey (Museum of Natural History, San Diego) for their great help with the collection material, used in the study.

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DEPOSITING ELECTROLYTES IN SKIN UNDER VARYING WATER-SALT METABOLISM STATES

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian
Vol 69, No 10, Oct 83 (manuscript received 5 Mar 83) pp 1352-1356

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[Abstract] Stability of concentration of electrolytes in internal liquids depends on their entry into and exit from the body's reserve. The present study reports on conditions for the introduction of isotonic solutions of NaCl, KCl or $MgCl_2$ into test white rats and *Rhombomys opimus* L, the latter because these animals often have high salt amountssin their diets. Separate groups were designated for each salt. Statistical processing using the Student t-criterion indicated that in water-salt homeostasis, the skin can extract ions from the blood during excess entry into the organism for subsequent bonding and depositing. Within 4 hours of administrating salt solutions into blood plasma, no shifts in normal concentration values could be measured, but metabolism, for example of potassium, had accelerated greatly in the skin. The skin thus retains ions in an unspecific manner until the indicated electrolytes are needed. Similar values were noted on spinal and abdominal skin areas. Figure 1; references 8; 6 Russian, 2 Western.
[272-12131]

METHOD OF PRESENTING POWER DISTRIBUTION OF ELECTROENCEPHALOGRAM SIGNAL ACCORDING TO FREQUENCY SPECTRUM

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian
Vol 69, No 10, Oct 83 (manuscript received 31 Mar 83) pp 1376-1379

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[Abstract] Various methods are currently used to extract useful information from EEGs, but little classification of their accuracy has been made. The present article reports on factors of the function of spectral amplitude density of EEGs as a parameter for establishing norms. Practical analyses indicate that high-frequency signals and lower ones are fully comparable, but since the oscillations of the latter are as much as 25 times smaller, more care must be taken in reading them. Principles of hydromechanics are applied to show that the frequency ranges used in electrophysiology as equivalents of biorhythms follow a logarithmic arithmetic progression that facilitates the establishment of mathematical norms for EEG signals. Using the range of 1.5-2 Hz, widely regarded as the most informative, the authors demonstrated, with grass frogs, that characteristic EEG spectral amplitude densities in initial sleep were statistically reliable to $p < 0.01$. Figures 2; references 8 (Russian).

[272-12131]

IMMOBILIZATION OF METHANE-OXIDIZING BACTERIA ON COAL PARTICLES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 5, Sep-Oct 83
(manuscript received 26 May 82) pp 32-36

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[Abstract] A variety of methods are employed for the immobilization of bacteria in order to increase their industrial utility, with the present study employing coal particles for the immobilization of *Methylobacterium rubra*, an obligate methane oxidizer. A definite relationship prevailed between the concentration of the bacterial suspension and the size of the coal particles in terms of the number of cells immobilized. Decreasing the particle size from 3 to 1 mm increased the surface area of the coal particles 7.2-fold with a corresponding increase in bacterial adsorption of 1.5-fold. Further calculations demonstrated, that depending on the bacterial concentration in a suspension, 1.6×10^4 to 6×10^6 cells were adsorbed to a surface area of 22.33 m^3 . The degree of adsorption was unaffected by the physiological status of the cells or the extent of metamorphism of the coal samples tested. The methane-oxidizing activity of the immobilized cells was greater than that of the cell suspension and retained its activity for 12 months. Figures 4; references 9: 8 Russian, 1 Western.

[252-12172]

FORMATION OF BIOLOGICALLY ACTIVE SUBSTANCES BY MESO- AND THERMO-
PHILIC FUNGI GROWN ON CELLULOSE- AND STARCH-CONTAINING SUBSTRATES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 5, Sep-Oct 83
(manuscript received 31 May 82) pp 55-60

ZAKORDONETS, L. A., BILAY, T. I., SUPRUN, S. M. and CORBIK, L. T.,
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Kiev

[Abstract] Meso- (*Fusarium*, *Acremonium*) and thermophilic (*Thielavia*,
Malbranchea, *Thermoascus*) fungi were grown on cellulose- (straw) and starch-
containing (wheat shafts) substrates to determine the effects of the fungi
in improving the nutrient quality of fodder substrates. Fungal growth was
found to increase the protein content of the substrates three to eight-fold,
amino acid content 1.5- to seven-fold, and the concentration of lipids two-
to four-fold. In addition, an increase was also seen in the concentration
of certain vitamins, such as riboflavin, thiamine, pyridoxine, and nicotinic
acid. These observations indicate that the hyphomycetes in question can be
used successfully in improving the quality of feeds. References 30:
1 Ukrainian, 26 Russian, 3 Western.
[252-12172]

UDC: 632.4:633.11:582.282.12

DEVELOPMENT OF METHOD OF CULTIVATING ERYSIPIHE GRAMINIS DC. F. SP. TRITICI
MARCHAL FUNGUS - WHEAT POWDER-MILDEW PATHOGEN - UNDER ASEPTIC CONDITIONS

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 17, No 3, May-Jun 83
(manuscript received 7 Sep 81) pp 251-254

NATAL'INA, O. B. and KOLOMIYETS, N. V., Kuban Agricultural Institute

[Abstract] In studies conducted in 1974 through 1979, the authors developed
a method for production of wheat plants under aseptic conditions, infestation
of the plants with an active form of the powdery mildew pathogen and production
of a practically pure culture of the pathogen with viable conidia under these
conditions. The wheat was grown from seeds under sterile conditions on a
nutrient medium and infected under conditions facilitating study of the sub-
sequent infection process. Several methods of seed disinfection were studied,
the most effective being treatment with potassium permanganate. Powdery
mildew developed on the wheat plants under aseptic conditions before the end
of vegetation of the plants themselves, forming abundant viable conidial
spores. The aseptic method was thus successful in production of *E. graminis*
grain powdery mildew pathogen. References 6: 5 Russian, 1 Western.
[253-6508]

PARAPSYCHOLOGY

'EXTRASENSORY MEDIUMS' DEBUNKED

Moscow LITERATURNAYA GAZETA in Russian 19 Oct 83 p 14

[Article by Aleksandr Kitaygorodskiy: "Telepathy? Please!"]

[Text] LITERATURNAYA GAZETA has more than once discussed so-called "extrasensory mediums." An unexpected turn in this discussion is presented by a professor and doctor of physical-mathematical sciences who has authored published notes.

Have you ever thought about the difference between miracles and hocus-pocus? In the circus and on stage, magicians do tricks whose secrets even the smartest person cannot guess. In any case, I am unable to explain how the hocus-pocus artist manages to pull from an empty box about 40 yards of colored ribbon, five pigeons, and several buckets of water. I recall puzzling unsuccessfully for several days over how Kio (the elder) commanded a playing card to come out all by itself from a glass in which a deck of cards was placed.

There are tricks whose secret is unknown to me. For example, how does one make a rope stand rigid so that you climb it like a pole? And the overwhelming majority of hocus-pocus tricks are utterly incomprehensible. Consider, for example, the miraculous escape of the famous American illusionist Harry Houdini. Bound in chains fastened by several locks, he was placed into a trunk which was also fastened with several locks.... After all these operations the trunk was thrown into the Thames. The illusionist swam out and freed himself from the chains.

For the viewer these miracles are not miracles--they are hocus-pocus, sleight-of-hand, not magic. So when, for example, Wolf Messing found an object hidden in the purse of a woman sitting in the third row...well, he didn't find it by himself but rather with the help of a so-called "inductor"--that is, an assistant "transmitting thoughts to him...." And not at a distance but right next to him, in addition allowing Messing to take him by the hand.... This is the kind of simple and long-since well-explained trick that the "average" viewer declares to be a miracle.

Incidentally, in the spirit of the times, such miracles are now given scientific-like names: telepathy, clairvoyance, telekinesis, and so on. All of them together are termed parapsychology.

Gerta Oniskevich, an artiste in the Volgograd Philharmonic, set herself the task of showing that the illusionist's genre--that is, tricks which everyone has seen in the circus--and parapsychology are close relatives. She demonstrates everything done by the devotees of parapsychology and shows that their feats boil down essentially to hocus-pocus.

To learn to work purely in the magical "parapsychology" genre is rather difficult. It takes months and years. It is an art, and like any art we ought to respect it. I propose, however, that it is a very important task to show and to demonstrate the harmfulness and dishonesty of passing an art off as mystical feats, that it is unacceptable to claim the existence of super-people possessing "divine gifts" that are unavailable to the "average man" it is a task that is no less important than the struggle against religion.

"Now I will cut the hand with a picket knife....," says the artiste. Noticing that the volunteer who has come up onto the stage flinches at the sight of the knife, Oniskevich calms him, rubs his hand with a wad of cotton, and...cuts it! All of us can see the cut, but "magical" words are uttered and the wound disappears.

Of course, neither magic nor "divine gifts" are at work here. It is chemistry....

(Amusingly, I asked G. Oniskevich, at one of our encounters, whether it was difficult to demonstrate the "Philippine miracle." She answered almost exactly as illusionist Amayak Akopyan did in LITERATURNAYA GAZETA No 34, 1983: "If necessary I can prepare the trick in 3 days....")

Then come the "telepathy" tricks.

Telepathy--transmission of thoughts at a distance--is, I firmly believe, pure "reniksa" (that is, nonsense--see A. P. Chekhov's "Three Sisters"). But the skilled performer can teach himself tricks which most viewers will take to be transmissions of "biological waves" from one brain to another.

One technique is to transmit information through code phrases. One may ask, for example, "What do I have in my hand?" or "What am I holding in my hand?" or "What is in my left hand?" and so on ad infinitum. In addition to phrase structure, the code may also make use of intonation. The words may be pronounced questioningly, or with pauses, or in an exclamatory manner.... In short, the code may have hundreds of options conveying complex information from a member of the audience to the performer on stage. And not just about a hidden object but also a house address, apartment number, number of children, and so on. The naive viewer is strongly impressed by this technique, and he thinks he is in the presence of a demonstration of a miraculous phenomenon.

The next trick is the transmission of information without any verbal or intonational code. The assistant (the author worked with G. Oniskevich and her master of ceremonies Gennadiy Vas'ko) invites a member of the audience to be the "extrasensory medium." Accompanied by this person the assistant

goes into the audience and asks the "medium" to write in a notebook any questions whispered by members of the audience. Then the master of ceremonies remains in the audience while the newly discovered telepath goes up onto the stage and faces the performer. He is asked to dictate, through his thoughts, the questions written in the notebook. G. Oniskevich repeats what was written down without any mistakes.

I myself do not know in this case how the information is conveyed. Perhaps the "medium's" face muscles move so that G. Oniskevich can read his thoughts, or perhaps the assistant, who remained in the audience, enables the performer to know beforehand that was written in the notebook through arm or shoulder movements. Very likely, it is the latter.

A second "telepathic" technique is ideomotorics. I shall attempt to explain it using as an example the work of Messing, an undoubtedly talented person who, however, gave mystical explanations for his art in order to mislead audiences and who lied a great deal....

A member of the audience was invited on stage. He was called the "inductor." The "inductor" was invited to take Messing by the hand (please note that Messing did not take the "inductor" by the hand but rather the reverse). The "inductor" was told to carry out some mission about which Messing did not know. He was supposed to dictate mentally to Messing "Come down from the stage, go to the fifth row, approach a particular lady, open her purse, and take out a handkerchief"--or something of that sort. While doing so he accompanied Messing to the target. If a person mentally dictates intensively, his muscles begin to quiver involuntarily and nearly unnoticeably (in 9 out of 10 persons, anyway). This is ideomotorics.

Messing offered to be blindfolded, and the trick worked. One time I managed to suggest that the "inductor" be blindfolded. Messing rejected the proposal. It was clear to him that it wouldn't work, for the "inductor" would not know where the fifth row or the designated lady was....

Tricks like this can be performed even when the "inductor" does not hold the magician's hand. Walking side by side, the key to the trick is the "inductor's" breathing and manner of walking....

The biophysicist Mikhail Bongard (no longer living) spent half a year mastering the techniques of ideomotorics and performed such feats just as well as Messing.

G. Oniskevich has mastered ideomotoric perception to perfection. Let's say various objects have been placed on a table. A member of the audience (knowing which object has been designated) takes the performer by the hand and slowly passes it over the table without touching the objects. The artist guesses which one it was without a mistake.

She shows convincingly that mastery of the ideomotoric technique is not an exclusive gift but rather a natural capability.

"Extrasensory mediums" whom some of our journals and newspapers have glorified as outstanding persons utilize both these techniques--clever tricks and ideomotrics.

As I have said, sometimes even I, for all my experience in removing the veil of mystery from the feats of magicians, find it difficult to explain hocus-pocus.

G. Oniskevich gently squeezes the hand of a member of the audience who does not know English and convinces him that now he can speak English and, in fact, he speaks pure English.

Then the performer invites the same person to sing a Neapolitan song. And he does....

How she does this I haven't the slightest idea. After the performance she told me that it was pure hocus-pocus.

Consider the trick of peeping. A good performer can learn to peep out even when he is blindfolded with several handkerchiefs. This was the favorite trick of Roza Kuleshova, who fooled audiences, saying she possessed clairvoyance.

To prove that we are dealing with hocus-pocus rather than "extrasensory" phenomena is simplicity itself:

"So, you possess the gift of clairvoyance?! Well, now.... Let us place several objects in a tightly closed box. Since you can see clearly through any obstacles, please tell us what's in it."

If anyone at all could demonstrate such an experiment, I would agree that there was really such a thing as clairvoyance.

Roza Kuleshova also claimed that she possessed "skin sight":

"So, you can demonstrate 'skin sight'? Excellent! But how about if we place a heavy sack on your head and bind it around the ears.... Now, if you please, go ahead and read. With your fingers, elbows, feet, or any other parts of the body.... It doesn't work?! Well then, I'm sorry. I shall keep my opinion that 'skin sight' is 'reniksa'!"

G. Oniskevich demonstrates her ability not only to see objects but also to read when she is blindfolded.

She concludes her performance with an effective demonstration of suggestion. Two volunteers from the audience are given test tubes containing a transparent liquid. One of them is told quietly that the test tube contains eau de cologne, the other is told that it contains alcohol.

"In a few seconds the smell will begin to spread," says the performer. "And now tell the audience out loud what is in the test tube."

Both volunteers really sense odors, in fact the very ones the performer told them. One smells alcohol, the other eau de cologne. It is then verified that both test tubes contained water!

Then she persuaded one of the volunteers that he was being drawn backwards, the other forward. Both, in fact, were impelled in the direction they were told.

Different people are affected differently by verbal suggestion (including, incidentally, auto-suggestion). So the experiment does not always come off the first time. Perhaps one out of every three people, however, submit to the power of the word immediately. And it produces a considerable impression.

G. Oniskevich does not use any equipment. But there are those who do pay tribute to the scientific-technical revolution. I witnessed one performer who fooled the audience using small radio transmitters. Through the use of an ultrasonic ray it is possible to convince the viewer that there is such a thing as telekinesis. A radio and a tape player can be used to conduct seances. And all sorts of other contrivances!

Thank goodness our circus rarely resorts to such devices!

In conclusion, I should like to make a small classification, Many people are inclined to lump different things into one heap.

And so.... There are phenomena which most people find it difficult or impossible to explain. In fact, they can be explained. We are speaking of phenomena which talented artists perform.

Then there are phenomena which have not yet been fully explained--phenomena such as suggestion, psychotherapy, psychophysiological self-regulation, psychophysical training.... Eventually the complex mechanism underlying these phenomena will be discovered. It is important to note that these phenomena are never in conflict with the laws of nature underlying modern science.

And then, of course, there is "reniksa"....

12255

CSO: 1840/258

UDC 577.322.4:591.145-546:543.422.23

NMR CONFORMATIONAL ANALYSIS OF SPACIAL STRUCTURE OF INSECTOTOXIN I₅A
BUTHUS EUPEUS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 12, Dec 83
(manuscript received 13 May 83) pp 1667-1689

ARSEN'YEV, A. S., KONDAKOV, V. I., MAYOROV, V. N., BYSTROV, V. F. and
OVCHINNIKOV, Yu. A., Institute of Bioorganic Chemistry imeni M. M. Shemyakin,
USSR Academy of Sciences, Moscow

[Abstract] The present study is a continuation of work reported earlier in which the aminoacid sequence of insectotoxin I₅A was established. In the present paper, principal attention is directed to detailed information on spacial structure of I₅A in aqueous solution. The NH groups participating in intra-molecular hydrogen bonding were determined; spin-spin interaction constants between H-N-C^α-H and H-C^α-C^β-H protons were determined characterizing the torsion angles ϕ and χ' respectively. Spacial proximity of protons in radicals removed from the aminoacid sequence was shown. The pK_a values of the ionogenic groups were found and their effect on chemical shifts of proton signals was investigated. On the basis of all data, a tridimensional structure of I₅A in solution is proposed showing similarity with the spacial structure of "long" toxin of the V-3 scorpion *centruroides sculpturatus*. Using a distance geometry algorithm, the overall folding of the molecule is proposed; the most probable set of disulfide bridges appears to be: cys²-cys¹⁹, cys⁵-cys³¹, cys¹⁶-cys²⁶ and cys²⁰-cys³³. Figures 18; references 35: 2 Russian, 33 Western (2 by Russian authors).
[243-7813]

AUTOMATIC DRUG INJECTION APPARATUS

Leningrad FIZIOLOGICHESKIY ZHURNAL in Russian Vol 69, No 8, Aug 83
(manuscript received 20 Oct 82) pp 1116-1120

AL'BERTIN, S. V. and VOYLOKOVA, N. L., Laboratory of Physiology of Higher Nervous Activity, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Description is provided of a small motor-drive pump injection apparatus designed to deliver microquantities of drugs at a rate ranging from 0.01 to 20 microliters per minute. The apparatus has been designed for bolus injections of continuous drug delivery, contains feedback circuitry, and five settings for the rate of delivery. The hermetically-sealed unit has been tested successfully for delivery of drugs into cerebral subcortical structures. Figures 3.

[263-12172]

UDC 615.471:616-009.7-07

HEAT ALGESIMETER

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 4, Jul-Aug 83
pp 63-64

PAPIN, A. A., PETROV, O. V. and VAGINA, M. A., Division of Anesthesiology and Revivification (Director: M. Ya. Avrutskiy, doctor of medical sciences), Scientific-Technical Department (Director: Candidate of Biological Sciences L. Ye. Sapuntsov), Institute of Surgery imeni A. V. Vishnevskiy (Director: Academician of USSR Academy of Medical Sciences, Prof. M. I. Kuzin), USSR Academy of Medical Sciences, Moscow

[Abstract] An attempt was made to construct an apparatus which could determine the threshold of pain perception. The proposed algometer consists of a cylinder with a parabolic mirror focused at a given point corresponding to a button with an opening which, when depressed, closes a circuit and activates a heat source--a light bulb. Two hundred volunteers were examined with this test instrument for thresholds of heat perception (H), pain perception (P) and pain endurance (E). The results showed surprisingly narrow range of values: $H = 5.8 \pm 0.64$ sec; $P = 14.8 \pm 0.82$ sec and $E = 21.0 \pm 1.92$ sec. It was proposed that this instrument could be used to evaluate the effectiveness of analgesic drugs. Figure 1; references 8: 3 Russian, 5 Russian.

[270-7813]

HEMOSORPTION-BASED INTENSIVE THERAPY FOR CHILDREN BITTEN BY POISONOUS
SNAKES

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 4, Jul-Aug 83 pp 61-62

ZHDANOV, G. G., KHOKHLOV, Ye. S. and UMANSKIY, Ya. L., Municipal Revivification-Consultation Center (Director: G. G. Zhdanov, doctor of medical sciences) in the facilities of Municipal Hospital No 20 (Clinical Director: V. V. Bonev), Rostov-na-Donu

[Abstract] The death rate in children bitten by poisonous snakes is rather high. Intensive therapy is symptom-oriented, directed at relieving various manifestations of intoxication along with administration of polyvalent antivenom serum. In the present paper, two case histories are reported in which hemosorption on SKN-2K sorbent was applied effectively, leading to rapid relief of acute intoxication symptoms and improvement in general condition of the pediatric patients. References 4 (Russian).

[270-7813]

UDC 616.8-091.817-003.93-02:615.356:577.164.16

MECHANISM OF EFFECT OF METHYLCOBALAMINE ON PROCESSES OF RECOVERY OF
FUNCTIONS OF NERVE-MUSCLE SYSTEMS IN MECHANICAL AND TOXIC DENERVATION

Moscow-FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 6, Nov 83
(manuscript received 9 Feb 83) pp 9-11

MIKHAYLOV, V. V., MIKHAYLOV, V. Vas. and AVAKUMOV, V. M., Chair of Pathological Physiology, Moscow Medical Stomatological Institute imeni N. A. Semashko

[Abstract] Following mechanical and chemical trauma, numerous neurons, especially of motor nerves, degenerate. The authors sought to determine whether methylcobalamine would strengthen protein synthesis in nerve cells and thus help restore lost functions. White rats were studied in regeneration of mechanically damaged nerves and ones damaged by botulism. After the trauma, regenerative dynamics were determined by measuring synaptic nerve-muscle transmission, membrane potential of myocytes and restoration of function in extremity muscles. A high number of highly-polarized myocytes were found in the tested muscles as an apparent result of methylcobalamine activation of protein synthesis and subsequent RNA mobilization. The substance had a protective effect on the process of restoration of nerve-muscle systems after botulism toxin damage as well, with clear results emerging within 30 days. Figures 4; references 9: 4 Russian, 5 Western.

[254-12131]

THIOL COMPOUNDS IN COMBINED THERAPY FOR PROSERINE POISONING

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 6, Nov 83
(manuscript received 1 Mar 83) pp 67-69

TRINUS, F. P., RYABUKHA, T. K., CHUBENKO, A. V. and FEDOTENKO, O. I.,
Kiev Scientific Research Institute for Pharmacology and Toxicology,
UkSSR Ministry of Health

[Abstract] Present antidotes for cholinesterase poisoning are insufficiently effective, are toxic and have side effects. Taking account of the choline-receptor function of disulfide and sulfahydrile compounds, the authors studied protective properties of the thiol compounds unithiol and dithiotreite in combination with atropine and dipyroxim. Proserine was administered to white rats (weighting 190-240 g) in a DL₅₀ form, and the effectiveness of the antidote therapy judged on the basis of DL₉₉ proserine growth. Results showed the most effective protection was with atropine, followed by dipyroxim and unithiol, with dithiotreite. The results are depicted in a triangular model, whose values are explained. Dithiotreite enhanced atropine action on proserine intoxication, while unithiol had an antagonistic effect. Figure 1; references 12: 6 Russian, 6 Western.
[254-12131]

ION CHANNELS OF ELECTRO- AND CHEMOACTIVATED MEMBRANES OF NEURONS AS OBJECTS OF EFFECTS OF PSYCHOPHARMACOLOGICAL SUBSTANCES

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 6, Nov 83 pp 99-105

ABRAMETS, I. I., Department of Pharmacology, Donetsk Medical Institute
imeni M. Gorky

[Abstract] This is a survey of the literature on the gradual penetration of activated membrane physiology into pharmacology. Electro- and chemoactivated ion channels of neuron membranes include hypersensitive and insensitive components in spinal ganglia. Electroactivated soma calcium channels result in a slowly increasing current, a rapidly increasing current or a calcium-dependent variant. Chemoactivated channels cause shifts in membrane potential approaching a critical depolarization or moving away from it, but channel conductivity remains constant. The effects of psychopharmacological substances on neuron channels are related to restructuring of the brain's neuromediating functions during constant introduction of antipsychotic neuroleptics. Increases in the number of specific ligand dopamine receptors is commonly connected to neuroleptics' blockage of striated post-synaptic and nigral presynaptic dopamine receptors, which, on the other hand, are regulated by a nigrostrionigral reverse loop. Benzodiazepine tranquilizers as sedatives and anticonvulsants function chiefly through purine and

beta-carboline groups. The slow action of antidepressants is related to braking of the neurons' impulse activity. References 88: 29 Russian, 59 Western.
[254-12131]

UDC 612.118.24

NEUTRALIZATION OF THROMBIN BY ANTITHROMBIN III IN PRESENCE OF HEPARIN
DURING ACTION OF COBRA POISON ON ANIMALS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian
Vol 69, No 10, Oct 83 (manuscript received 19 Jul 82) pp 1368-1370

PASTOROVA, V. Ye., Laboratory of Physiology and Biochemistry of Blood
Coagulation, Moscow State University imeni M. V. Lomonosov

[Abstract] Snake poisons are known to have various strongly acting biologically active substances, while certain fibrinolytic agents such as plasmin stop hypercoagulation, thus providing a protective function to prevent complete poisoning. The author assessed the spread of thrombin formation after injecting cobra venom, to explain the neutralization function of thrombin by antithrombin III alone and in combination with exogenous heparin. The test white rats were injected with venom in an NaCl solution into the jugular vein. Results showed that with 0.1 and 0.01% solutions, no thromboplastic activity was recorded for the poison. Rather, significant fibrinolytic properties were noted. A large dose of 1 ml of 0.1% solution per 180 g of body weight brought quick death. Where lesser doses were given, thrombin generation was not accompanied by activation of nonenzymatic fibrinolysis and increased anticoagulating, indicating the absence of a full protective reaction. Heparin did not prevent complete mortality with high doses. Both poisoning and thrombin formation caused the deaths. With smaller doses, heparin assisted antithrombin III in neutralizing the thrombin generated and providing partial protection against poisoning. References 6: 3 Russian, 3 Western.
[272-12131]

UDC 612.825

FUNCTIONAL BLOCKING OF BRAIN CORTEX UNDER NOVOCAIN ACTION

Tbilisi SOOBASHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 111, No 3, Sep 83 (manuscript received 2 Sep 82) pp 613-616

KVIRKVELIYA, L. R., KOBIASHVILI, L. N. and DUMBADZE, N. V., Institute of
Physiology imeni I. S. Beritashvili, GrSSR Academy of Sciences

[Abstract] Effect of novocain on direct electric responses of neocortex, on spontaneous ECoG and on primary visual reactions of nonanesthetized rabbits

were studied. After application of 20% novocain solution, direct response was almost totally blocked at the application site for a period of 40 min. Direct response to the symmetrically located contralateral hemisphere continued to be normal. Depression of direct and primary cortical responses is evidently caused by blocking the impulse propagation in afferent and efferent pathways, and by a drop in excitability of postsynaptic structures: the dendrites and the cellular bodies. Thus it was shown to be possible, indeed advisable, to use novocain for reversible local functional blocking of cortical structures. Figures 3; references 6: 2 Russian, 4 Western.
[245-7813]

UDC: 582.28:577.16/17

MYCOPHILIC FUNGI, PRODUCERS OF BIOLOGICALLY ACTIVE SUBSTANCES

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 17, No 3, May-Jun 83
(manuscript received 17 Jun 81) pp 195-199

TOROPOVA, Ye. G., LANDAU, N. S., SIDOROVA, I. I., YEGOROV, N. S., and
BERESNEVA, G. G., Moscow State University imeni M. V. Lomonosov

[Abstract] Mycophilic fungi are natural enemies of plant disease pathogens, but few studies have been conducted concerning the capabilities of these fungi for the production of various biologically-active compounds. In the present work, 44 strains of 15 species of mycophilic fungi were studied in terms of their capability to produce certain proteases and antibiotic substances. The fungi were grown on a rocker at 26-28°C in Erlenmeyer 750 ml flasks, each containing 100 ml of growth medium. The results showed that all strains grew quickly and stably in the media studied. The most active strains forming enzymes and antibiotics simultaneously were in the species *hypomyces rosellus*, but some of the species were also capable of forming biologically active compounds in significant quantities. This group of microorganisms may therefore be of interest for the search for new producers of various biologically active substances. References 8: 6 Russian, 2 Western.
[253-6508]

THE SEARCH FOR NEW ERGOT STRAINS PRODUCING PEPTIDE ERGOALKALOIDS

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 17, No 3, May-Jun 83
(manuscript received 17 May 82) pp 202-205

SARKISOVA, M. A., SHAIN, S. S. and BRITVENKO, L. I., All-Union Scientific
Research Institute of Medicinal Plants, Moscow Oblast

[Abstract] In order to discover new highly productive strains of ergot producing peptide ergoalkaloids in deep cultures, the authors studied the natural ergot *claviceps purpurea* (Fr.) Tul. collected in various areas of the country. To determine total ergoalkaloids, 25 mg of ergot powder were placed in a centrifuge test tube, 2 ml of a 4% solution of tartaric acid and 50% methanol were added and extraction was performed in a water bath at 50-60°C for 3 minutes. 2 ml of a 10% zinc acetate solutions were added and carefully mixed. The precipitate was centrifuged. 1 ml of tartaric acid was added to the supernatant fluid with 4 ml of van-urk reagent, the mixture was agitated and colorimetry performed. Natural ergot from various regions of the USSR was found to be a good initial material for use in the search for new strains for both parasitic and saprophytic ergot strains. Specimens were found which were of interest for further selection work.

References 7 (Russian).

[253-6508]

UDC 577.152.31:615.015.43

COMPARATIVE STUDY OF VERAPAMIL AND TUBOCURARINE EFFECT ON
ACETYLCHOLINESTERASE OF SKELETAL MUSCLE SARCOLEMMMA

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 55, No 5, Sep-Oct 83
(manuscript received 13 Jul 82) pp 513-516r

DYADYUSHA, G. P. and POLYAKOVA, N. K., Institute of Biochemistry
Imeni A. V. Palladin, UkSSR Academy of Sciences, Kiev

[Abstract] Study of the processes of inhibition of acetylcholinesterase of rabbit skeletal muscle sarcolemma by verapamil and tubocurarine showed them to be similar in many respects and suggested the possibility of their competition for the same binding sites. The Hill coefficient of verapamil is 0.7 and that of tubocurarine is 0.6, suggesting a mixed nature of inhibition of acetylcholinesterase by these substances. Increase of the ionic strength of the medium to 0.2 M reduces the inhibiting power of both substances without changing the Hill coefficient. Figures 4; references 13: 6 Russian, 7 Western.

[273-2791]

INTERACTION OF TETRODOTOXIN-SENSITIVE STRUCTURES OF SOLUBLE MYOCARDIUM-
PROTEINS WITH LIPOSOMES

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 55, No 5, Sep-Oct 83
(manuscript received 10 May 83) pp 548-551

GIMMEL'REYKH, N. G., STORHCAK, L. G. and LISHKO, V. K., Institute of
Biochemistry imeni A. V. Palladin, UkSSR Academy of Sciences, Kiev

[Abstract] Study of conditions which ensure formation of tetrodotoxin-sensitive, channel-like structures during interaction of soluble myocardium proteins and liposomes was studied and discussed. Formation of such structures was determined by change of permeability of proteolysosomes for Na^+ in the presence of veratrine (activator of potential-dependent sodium channels) and tetrodotoxin (specific blocker of sodium channels). The rate of formation of neurotoxin-sensitive proteoliposomes was temperature related. Effect of veratrine on sodium permeability of proteoliposomes increases with rise of temperature. Pretreatment of liposomes by veratrine prevents formation of tetrodotoxin-sensitive proteoliposomes. The experiments confirm the assumption that the fraction of myocardium-soluble proteins contains structures capable of spontaneous incorporation into the lipid membrane to form channel-like formations. Figures 3; references 13: 4 Russian, 9 Western.
[273-2791]

UDC 615.339:578.245].012.6

INDUCTION OF HIGH-ACTIVITY HUMAN γ -INTERFERON BY STAPHYLOCOCCAL ENTEROTOXIN

Moscow IMMUNOLOGIYA in Russian No 6, Nov-Dec 83
(manuscript received 22 Feb 82) pp 38-40

STRAUTYNYA, M. L., FELDMANE, G. Ya., DUK, A. E., KUSHKO, I. V. and
BALANDIN, I. G., Institute of Microbiology imeni A. Kirkhenshteyn, Latvian
SSR Academy of Sciences; Institute of Epidemiology and Microbiology
imeni N. F. Gamaleya, USSR Academy of Medical Sciences

[Abstract] Staphylococcus aureus enterotoxins A and B were tested for efficacy as inducers of human γ -interferon in a system using peripheral blood leukocytes. Vesicular stomatitis virus-infected L-41 cells served as indicators of interferon activity. The results indicated that both enterotoxins were effective in inducing interferon formation. Staphylococcal enterotoxin A induced the formation of thermolabile γ -interferon, while enterotoxin B induced the formation of heat-stable χ -interferon. The γ -interferon produced by testing native (unpurified) enterotoxin B was ascribed to the presence of enterotoxin A admixture. References 4 (Western).
[302-12172]

SUBSTRATE INHIBITION ANALYSIS OF CHOLINESTERASE FROM SPIDER
(LATRODECTUS TREDECIMGUTTATUS) VENOM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 1, Jan 83
(manuscript received 28 Jun 83) pp 225-228

CHERNETSKAYA, I. I., AKHUNOV, A., ABDUVAKHABOV, A. A. and SADYKOV, A. S.,
academician, Institute of Bioorganic Chemistry, Uzbek SSR Academy of
Sciences, Tashkent

[Abstract] Studies were undertaken on the identification of cholinesterases in the venoms of certain Central Asian arthropods, using the following specimens captured in Uzbekistan: the spiders *Stegodiphus lineatus*, *Latrodectus tredecimguttatus*, and *L. pallidis*, the scorpion *Buthus eupeus*, and the centipede *Scolopendra aral*. In all cases the highest rate of hydrolysis was obtained with acetylcholine as the substrate, with the *Latrodectus* sp. showing some activity with respect to propionylcholine. None of the enzyme preparations hydrolyzed butyrylcholine. Substrate inhibition analysis conducted with a purified enzyme derived from *L. tredecimguttatus* demonstrated its similarity to human erythrocyte acetylcholinesterase. Figures 3; references 9: 4 Russian, 5 Western.
[278-12172]

PSYCHOLOGY

CHECK YOURSELF

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 12, Dec 83 pp 44-45

OGORODNIKOV, Yu., candidate of philosophical sciences

[Abstract] Many readers of the title journal expressed interest in psychological self-examination tests. In this article five such self-administered tests are reported: tests for fear (reactive fear and individualistic fear); a test for coefficient of lying; a test for determining motivation in selecting a job; a test for evaluating job satisfaction, and a test for determining egotism, honesty and modesty. It is mentioned that these tests would be beneficial to supervisors.

[271-7813]

PUBLIC HEALTH

RURAL MEDICINE TODAY

Moscow ARGUMENTI I FAKTY 52 [169] 27 Dec 83 p 3

[Article by I. Borich]

[Text] Village--Technology--Man...In the system of decisive factors for agriculture, man is more and more often becoming the vulnerable link. Today, the relative share of the rural population in this country is 35.6 percent. Work productivity of those who work in the villages depends more often not only on technology and wages, but also on social conditions. Let us take, for example, accessibility and quality of medical aid. In a particular village, there is no dentist, and a milkmaid was sent to the rayon center. A day was lost, and really it is not easy to replace a milkmaid--she services at least 100 cows.

And it isn't only the material loss. Reliable, accessible medical aid is one of the guarantees of quality life and a necessary condition for stability of the rural population. This is why one of the primary goals in the plans of reorganization for our village, which the Food Program stipulated, were to improve health protection for farmers, cattle-breeders and members of their families and to bring medical aid closer to them.

The physician-ambulatory [medical out-patient clinic] in the village of Stetseva of the Ivano-Frankovska Oblast serves the inhabitants of three villages with 2093 households. There are three physicians in the clinic--a therapist, pediatrician and stomatologist. The farthest village is 5 kilometers away. In rural measurements--within walking distance. And the rayon center is not far from Stetseva, 9 kilometers, and the central hospital is there, with capacity of 525 and a large staff of physicians.

But people are coming to the rayon hospital from these three villages less and less often. Perhaps the physicians consider treatment in a hospital necessary or send them to the rayon polyclinic for consultation

with a specialist. The fact is that in the rural ambulatoriya there are physicians of basic and the most common specialties. After all, there are electrocardiograph, physical-therapy, treatment and obstetric offices and a clinical laboratory. There is a good pharmacy there and a small infant-feeding center.

If the village inhabitants need to see an oculist or a neuropathologist or to take their child to an otolaryngologist or a surgeon, it is not necessary to go to the rayon hospital. These specialists regularly, according to a schedule, come to the ambulatoriya and accept visits.

There are, in all, 76 rural ambulatoriyas in the Ivano-Frankovsk Oblast. They have allowed physicians to be brought closer to field and farm workers.

The development and improvement of rural ambulatoriyas and regular trips of rayon hospital physicians to these places has led to the change of a very important factor of the availability of qualified medical aid: the average annual number of visits of the physician to the village inhabitants. Seven years ago it amounted to approximately 3-4 in the Ivano-Frankovsk Oblast, and now it is 8. For the sake of comparison, in this country, on the whole, a city-dweller visits a physician on an average of 12-13 times a year, while a rural dweller visits a physician 5-6 times a year. This indicator, as we see, is higher for Ivano-Frankovsk medical workers. They are successfully solving a task proposed by the Party: at the most, to bring the level of medical aid in the village maximally closer to that of the city.

This course is general for all this country's health service. Seven years ago, we had 3849 rural ambulatoriyas and in 1982--5888. In accord with the resolution of the May (1982) CPSU CC Plenum, it has been projected to open 1950 rural physician-ambulatoriyas in this Five-Year Plan, and in the 12th Five-Year Plan, more than 3000.

Rural Hospital

Qualified medical aid is also coming closer to agricultural workers, due to the consolidation of central rayon hospitals. In the Ivano-Frankovsk Oblast, large hospitals--with a capacity of 300-500--have been opened in 9 out of 14 rayon centers. The rayon population can receive medical aid here in 12-16 specialties, which relieves many from having to be treated in the oblast hospital.

In all, the hospital fund for central rayon hospitals throughout the country increased 20 percent over the past 5 years. More and more, a hospital is getting a capacity of 400-600 beds. Departments and offices of 20-30 specialties work here. Today, approximately 60 percent of patients are receiving treatment in precisely these central rayon hospitals.

The uchastok hospitals were reorganized at the same time that the development in our country of the central rayon hospitals was intensified. In 1970, there were estimated to be more than 11,000, and since then more than 2000 have been closed. In these small hospitals, the level of treatment

was low and they did not meet sanitary-hygiene requirements. However, more than 8000 such hospitals still remain in this country. This is caused primarily by a significant dispersion of rural settlements (there are estimated to be more than 400,000 of them) and the lack of good roads in many areas. Such a high population density and such compact rayons with well-developed communications, as in the Ivano-Frankovsk Oblast, are not found everywhere, to say the least. Whereas the average radius of a rayon in the Ukrainian and Moldavian SSRs is 15-20 km, in the RSFSR, it is 52.2 and in Kazakhstan--300 km. In Siberia, some villages are hundreds of kilometers away from rayon centers. This makes it necessary for the time being to retain the morally-outdated small uchastok hospitals, where village inhabitants, when necessary, can quickly receive aid and not wait for the arrival of specialists from the rayon or oblast center.

Medical Aid Arrives in the Village

In connection with the fact that populated areas are far apart, the problem of developing mobile types of medical aid is important. In the village, ambulatoriyas and clinical laboratories which have been converted into buses and stomatological and fluorographic offices on wheels have gained recognition. Now there are 308 mobile stomatological stations in our country. Unfortunately, although their number is growing, the need for means of conveyance has still not been met completely.

The weak link in rural health service is first aid [skoraya pomoshch]. In central rayon hospitals, as a rule, departments or stations of first aid are open, but the brigades are mainly feldshers and they primarily serve the population of the rayon centers themselves. It has been projected to complete organization, by 1985, of first aid in all rural rayons.

Now in each oblast, kray and republic center, a station for taking electrocardiograms is being created at a distance from rayon and even uchastok hospitals. Specialists will be interpreting EKGs on the spot, thereby helping their rural colleagues to quickly diagnose a case and treat the patient correctly.

NUMBER OF RURAL AMBULATORIYAS

YEAR:	<u>1970</u>	<u>1976</u>	<u>1980</u>	<u>1982</u>
	2598	3849	4956	5888

NUMBER OF PHYSICIAN VISITS TO RURAL INHABITANTS IN A YEAR (on the average):

YEAR:	<u>1975</u>	<u>1980</u>	<u>1982</u>
	4.3	5.3	5.6

CSO: 1840

GEORGIAN POLYTECHNIC INTRODUCES ELECTRONIC MEDICAL EQUIPMENT MAJOR

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 13 July 1983 page 3 carried Georgian Polytechnic Institute Rector Academician T. Loladze's 800-word article describing a new department just introduced to train engineers in the design, development and operation of electronic medical equipment. Specialists in this field are currently trained in Leningrad, Moscow, Tomsk, and elsewhere, and it was deemed necessary to provide such training also in the Transcaucasus, where many laboratories, clinics, hospitals, and other treatment facilities are provided with expensive, sophisticated Soviet-made and foreign equipment which, all too often, is not being used to best effect because of the lack of properly trained personnel. The new specialty differs from other engineering courses at Polytechnic in that biomedical instruction is required (various components of the course of study, numbered 0627, are listed). The first students are to begin this year. Some half a million rubles have been invested in laboratory equipment. Firm liaison has been established with the Tbilisi Machine Building Technicum, which is also introducing a new specialty titled "X-Ray and Electronic Medical Equipment Installation and Repair."

CSO: 1840/262

BRIEFS

SWIMMING AT THE POLYCLINIC--A pool where one can learn to swim and go through strengthening exercises has been made available to patients of a children's polyclinic which just opened in Bel'tsy. The main concerns of the medical staff are prophylaxis for children's illnesses, instruction for young parents in treating the children and teaching children habits of personal hygiene. Along with the usual physicians' offices, there is also a room for therapeutic gymnastics and rooms for physical therapy, mud therapy and massage. A gallery connects this polyclinic with the municipal children's hospital. The new treatment unit was constructed from funds earned by workers of Bel'tsy on communist "subbotniks" [volunteer work on Saturdays]. It is a part of a polyclinic complex created for a program of specialization of medical aid to children and adults. A year and a half ago, the multi-profile polyclinic for adults with a capacity for 870 visitors a shift was added to the structure. [Text] [Kishinev SOVETSKAYA MODDAVIYA in Russian 18 Dec 83 p 4] 12473

HEMATOLOGY CENTER--A hematology center has been opened in Yerevan. The tall building houses a clinic with 150 beds, a children's ward, operation rooms and laboratories equipped with cryogenic apparatus for preservation of blood. [Text] [Moscow PRAVDA in Russian 17 Dec 83 p 2 1.2.3.-Cat 24] 12473

LET THE CHILDREN GROW UP HEALTHY--The All-Union Scientific-Practical Conference on the problem of "Hypokinesis and Athletic Hyperkinesis of the Growing Body and Their Correction" opened in Tashkent on December 13. Prominent scientists and experienced workers in the fields of medicine, physical education and athletics, pedagogy and psychology, from Moscow, Leningrad, all capitals of union republics and other large cities of our country are participating in it. For 3 days they will discuss important questions of harmonious development, strengthening of health, the role of physical culture in therapy and prophylaxis of children's illnesses and physicians' control over young athletes. Ye. Ch. Novikova, USSR Deputy Minister of Health, is participating in the conference. [Text] [Tashkent PRAVDA VOSTOKA in Russian 14 Dec 83 p 2] 12473

CURRENT PROBLEMS IN ADMINISTRATION OF AMBULATORY POLYCLINIC CARE

Moscow MEDITSINSKAYA TEKHNIKA in Russian No 4, Jul-Aug 83 pp 3-7

GAVRILOV, N. I., All-Union Scientific Research Institute of Social Hygiene and Health Administration imeni N. A. Semashko, Moscow

[Abstract] Some of the problems encountered in the administration of ambulatory-polyclinic care in the USSR are analyzed with a view toward making necessary improvements in the health care of the population. Despite the serious efforts made in recent years to improve the quality of care, many difficulties and problems still remain to be resolved. Many of the clinics are uneconomical because of the small number of visits and are either over- or under supplied with medical equipment and apparatus. In addition, the quality of medical care is all too often not of the highest caliber possible, and a statistical analysis of some urban polyclinics has shown that diagnostic and therapeutic errors may range from 13.2% to 30.2% of the cases handled. In many cases it is also difficult to obtain appropriate consultation from specialists within a reasonable period of time: in 52.1% of the cases where a specialist has to be seen, the waiting time is one to three days, and in 20.2% of the cases more than ten days. These examples alone serve to indicate the kind of extensive and careful planning that will have to be undertaken to render the facilities in question a more viable and useful component of the national health care.

[235-12172]

RURAL HEALTH CARE DESCRIBED

Moscow AGITATOR in Russian No 24, Dec 83 pp 21-24

BURENKOV, S., USSR Minister of Health

[Abstract] In line with the assignment by the June 1983 CPSU plenum, the health services of the USSR are being brought into line with the demands of developed socialism, according to the author. He stresses preventive medicine in describing expansion of the system of rural dispensaries and clinics for general, obstetric and pediatric care. Yearly medical check-ups

(so-called preventive dispensarization) of the entire population requires improvement of the work of polyclinics, medical-sanitary units, mother-and-child care institutions, hospitals, rural medical establishments, medical VUZ clinics and scientific-research institutes. Primary health care units are receiving particular emphasis in both small and large rural clinics. Medical training and continuing education for medical and pharmaceutical personnel are being improved. The system of medical care begins with the physician-uchastok and reaches through feldsher and midwife stations to collective farm lying-in homes and the central rayon hospitals, which in larger cities average 279 beds. Oblast-level clinics provide all manner of specialized care for the rural population. Supplying modern medicines and improving access to specialized care are major objectives being pursued. Care for mothers and children in the rural environment is being improved, and efforts continue to educate the populace in safety from both disease and trauma, and to pursue scientific research into special rural health problems. A continuing major problem is the turnover of rural health care personnel, and major efforts are being launched to improve their personal and professional amenities so as to retain them in the village. Moral and ideological training form a part of this effort, and they include recognition for outstanding rural practitioners, in part in the form of a "Traveling Red Banner of the CPSU Central Committee" awards.

[249-12131]

PROTECTING INTERESTS OF MOTHER AND CHILD

Moscow AGITATOR in Russian No 24, Dec 83 pp 24-25

KRAYCHENKO, M. M., deputy chairman, USSR State Labor Committee, with correspondent M. Ivanov

[Abstract] The present interview presents the deputy chairman's views on key issues in care for mother and child, including maternity leave time, which covers 56 days before and 56 days after birth when birth is normal, and can be extended when difficult pregnancies or childbirth problems occur. This leave with full pay can be followed by leaves of absence, and other privileges include time off for nursing the infant (1/2 hour breaks every 3 hours, or more liberal with physician's orders). Job assignments may be changed to benefit new mothers, and pregnancy cannot be an excuse for refusing to hire a qualified worker or for dismissal. Pregnant women, nursing mothers and those with children under 1 year of age cannot be dismissed, and maternal privileges must also be granted to recently hired employees.

[249-12131]

PRIZE FOR...HEALTH

Tallinn SOVETSKAYA ESTONIYA in Russian, 19 Jan 83 p 2

GLAZKOVA, V.

[Abstract] The article reports on measures for improving the health of children attending day care center No 9 at the "Baltiyskaya Manufaktura" plant. The plant conducts competitions for the best health histories among children attending its day care centers and kindergartens. The personnel provide a healthy, airy environment, physical exercise, good food and attention to health problems, so that child illnesses and consequently, parent absences from work, are minimized. Details such as barefoot play for strong arches and elimination of pacifiers for good orthodontic development are monitored, as well as general supervision of the children's wellbeing.

[280-12131]

UDC 616-001.28-036.11-07:616-831-005-036.8

CEREBRAL HEMODYNAMICS IN PROTRACTED ACUTE RADIATION DISEASE IN MAN
(CLINICAL AND ELECTROPHYSIOLOGICAL STUDY)

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 28, No 6, Jun 83
(manuscript received 16 Nov 82) pp 62-66

TORUBAROV, F. S. and KOGAN, A. M.

[Abstract] The goal of the present study was to summarize the material obtained in clinical and physiological studies of patients with acute radiation disease (ARD) of different degree of severity and to analyze the state of cerebral vasculature during an extended period. It was observed that patients who suffered from ARD showed various clinical manifestations of vascular pathology occurring much earlier and more often than in age-matched controls. This included arteriosclerosis with damage of cerebral vessels, syndromes of chronic cerebrovascular insufficiency and encephalopathies of discircular and mixed type. The degree of these pathological manifestations and their onset were related to the extent of ARD. Rheoencephalographic investigations of ARD patients showed an increased resilient-viscous state of fine vessels caused by functional and organic alterations in their walls, leading to lower blood supply to brain tissues. Figures 2; references 12 (Russian).
[238-7813]

UDC 636.616:632.938.2

BRUCELLOSIS AND IMMUNOLOGICAL TOLERANCE IN CATTLE

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
(manuscript received 9 Jan 81) pp 100-104

NOVITSKIY, A. A., BAZHIN, M. A., KONDAUROV, B. I., KOSILOV, I. A and
MIRONENKO, A. T., Siberian and Far Eastern Institute of Experimental
Veterinary Medicine, Krasnoyarsk, Novosibirsk Oblast

[Abstract] Serologic studies conducted on calves infected in-utero or within the first 3 weeks after birth with *Brucella abortus* showed that such animals often fail to launch an immunological response against a subsequent challenge with live virulent or attenuated strains of the same microorganism. This lack of responsiveness is ascribed to the development of immunological tolerance. Since such animals may constitute a reservoir of infection, the recommendation is made that such animals be tested for agglutinin formation within 14 days of vaccination to determine their status as potential carriers.

References 6: 1 Russian, 5 Western.

[240-12172]

UDC 636.4:619:61-08

PURIFICATION AND PHYSICOCHEMICAL CHARACTERISTICS OF TRANSMISSIBLE GASTROENTERITIS VIRUS OF SWINE

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
(manuscript received 22 Dec 81) pp 105-108

NIKOLAYEVA, N. P. and MEL'NIKOVA, L. A., All-Union State Scientific Control
Institute of Veterinary Preparations, USSR Ministry of Agriculture, Moscow

[Abstract] The gastroenteritis virus of swine cultivated in primary cultures of porcine renal cells was subjected to purification and sedimentation analysis in a variety of density gradients. Sedimentation analysis in a linear sucrose gradient yielded a peak possessing infectivity in the 1.18 g/ml density zone for strain V₉₁, and in the 1.24 g/ml for strain Miller.

The latter strain sedimented in the 1.29 g/ml zone in cesium chloride. Treatment of the virions with the enzyme bromelain did not result in loss of infectivity for the kidney cells, but sedimentation of the particles shifted to the 1.15 g/ml zone in the sucrose gradient. Figures 4; references 9: 1 Russian, 8 Western.
[240-12172]

CONFERENCES

BRIEFS

MEETING OF ONCOLOGISTS--Prominent medical scientists of socialist countries met in Tbilisi, where a meeting of experts of countries which are members of the Council for Mutual Economic Aid convened on December 6 to discuss problems of epidemiology of malignant neoplasms in women. Delegations of oncologists from Hungary, the GDR, Cuba, Poland, the USSR and Czechoslovakia participated in it. Conference participants greeted Professor L. Sharashidze, director of the Oncological Scientific Center of the Soviet Ministry of Health. L. Charkviani, problem curator, USSR State Prize Laureate and head of the oncology department of the scientific center of Georgia, presented a report on several goals and future plans of collaboration of countries which are CEMA members in the field of the epidemiology of gynecological cancer and its surgical and combined treatment. [Text] [Tbilisi ZARYA VOSTOKA in Russian 7 Dec 83 p 4] 12473

MEMBRANES AND BIOPHYSICS--A republic conference held in Kutaisi dealt with membranology--a new branch of biological science. It was organized by the biophysics department of the Tbilisi University and the biology faculty of the Kutaisi Pedagogical Institute imeni A. Tsulukidze. Specialists from scientific centers of Moscow, Leningrad, Kiev and Minsk took part in the conference. More than 20 reports were heard on important questions of membrane biology and on the application of results of their analysis in medicine and agriculture. The reports reflected various trends in membranology. [Text] [Tbilisi ZARYA VOSTOKA in Russian 8 Dec 83 p 3] 12473

PERSPECTIVES OF GENETICS--The fifth all-union symposium dealing with molecular mechanisms of heredity was held in Moscow, at the Institute of General Genetics of the USSR Academy of Sciences. Scientists of Moscow, Leningrad, Novosibirsk, Odessa, Dubna and other cities, in addition to the most important theoretic problems of molecular genetics, discussed the first real advances and perspectives of their practical use, primarily in medicine and agriculture. [Text] [Moscow IZVESTIYA in Russian 31 Dec 83 p 5] 12473

SCIENTIFIC CONFERENCE ON APPLIED ENZYMOLOGY

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 5,
Sep-Oct 83 pp 697-698

GLEMZHA, A. A.

[Abstract] The author reports on the title conference, held at the Scientific Research Institute for Applied Enzymology in Vilnius, 7-8 December 1982. Among the 24 papers delivered were reports on production and use of new enzyme products for molecular biology, genetics and genetic engineering, technological advances in producing high-purity enzymes for analytic use such as urease from *Staphylococcus saprophyticus*, glucoso-6-phosphatodehydrogenase from *Streptococcus paracitrovorus* and others, and problems of expanding enzyme utilization in the economy. Prospects for future development, selective analytic systems for measuring monosaccharides and disaccharides and protease substrates permitting rapid measurement of cellulose components, are also discussed.
[250-12131]

SYMPOSIUM "BIOCHEMICAL METHODS IN ORGANIC SYNTHESIS"

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 5,
Sep-Oct 83 pp 700-703

YEGOROV, A. M.

[Abstract] The title symposium was held in Plovdiv, Bulgaria, 18-21 May 1982, with 70 scientist participants, largely from the academies of sciences of the socialist countries or Bulgarian research institutes. Methods for cell immobilization and subsequent use, and problems of enzyme synthesis of peptides and antibiotics, formed the two major topics under consideration. Immobilized cultures included *Arthrobacter globiformis* 193, *Saccharomyces cerevisiae*, *Bacillus megaterium*, *Tiehemella orchidis* and *Mycobacterium album*. A *globiformis* was used to reduce hydrocortisone into prednisalon, and an optically active methyl ether produced, in a Soviet report. Cells of *Citrobacter freundii* with high tyrosine-phenoliase activity catalyzed synthesis of DOPA[3,4-dioxyphenylalanine], which received attention from

several investigators reporting at the conference. Synthetic and natural methods for producing DOPA are discussed, in hopes of filling the worldwide demand for this enzyme. Enzyme synthesis of peptides through aminolysis of two-phase organic solvent-water systems are discussed. Bacterial aminoacylase was discussed as a means for producing D-phenylglycine and its racemic mixtures. Aminoacylase from *Micrococcus agilis* cell extract was effective for producing immobilized aminoacylase.
[250-12131]

MISCELLANEOUS

UDC 615.2/.3.012.551.35.054.5(049.32)

MARINE PHARMACY: THEORY AND PRACTICE OF NEW TRENDS IN PHARMACEUTICAL SCIENCE
[book, MORSKAYA FARMATSIYA (TEORIYA I PRAKTIKA NOVOGO NAPRAVLENIYA V
FARMATSEVTICHESKOY NAUKE)]. [AUTHORS: AZHGIKHIN, I. S., SHPAKOV, Yu. N.,
KAPIANI, R. Ye. and GANDEL', V. G., Kishinev, Shtiintsa, 1982 260 pp]

Moscow FARMATSIYA in Russian No 6, Nov-Dec 83
(manuscript received 30 May 83) pp 84-86

GURIN, I. S., professor, Moscow [Reviewer]

[Abstract] This is a review of a book which is of interest in that it covers a newly developing branch of the pharmaceutical sciences, namely that of marine pharmacy. The book is organized into eleven chapters and contains a bibliography of 275 citations, of which 53 are Soviet. The five sections of the book deal with the role and significance of marine pharmacy within the larger scope of pharmaceutical sciences as a whole, the various chemical groups of substances possessing biological activity, pharmaceutical aspects of hydrobionts, supportive agents of marine origin, and marine toxicology. An appendix contains the structural formulas of 21 of the most promising marine agents. Since this book covers a new area of drug research, minor deficiencies encountered in it, such as repetitions, lack of an index of chemical substances, etc., cannot detract from its fundamental contribution to pharmaceutical knowledge.

[236-12172]

SIGNAL-TO-NOISE RATIO AS FUNDAMENTAL SPECTRUM PARAMETER

Baku DOKLADY AKADEMII NAUK AZERBAYDZHANSKOY SSR in Russian Vol 39, No 6,
Jun 83 (manuscript received 11 Jan 83) pp 62-65

ALIYEV, D. A., academician, GULIYEV, F. A. and RAZIYEV, S. E., Institute
of Soil Science, Azerbaijan SSR Ministry of Agriculture

[Abstract] A discussion is presented of the significance of the dark current in photoelectric multipliers used in the detection of biological fluorescence. Such currents contribute to signal distortion and appearance of artifacts which render difficult the resolution of the spectrum components. A schematic diagram is presented for a circuit which diminishes the noise contributed by the dark current and improves the signal:noise ratio to 40-50:1. As a result, weakly fluorescent signals with quantum yields of 0.1% became detectable. Figure 1; references 24: 18 Russian, 6 Western. [248-12172]

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